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REPORT

OF THE

DRUGS ENQUIRY COMMITTEE

1930-31

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REPORT OF THE DRUGS ENQUIRY COMMITTEE, 1930-31.

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CORRIGENDA.

Page 16, line 4 from bottom, *for* " 527 " *read* " 526 ".

,, 23 ,, 7 from top, *for* " defination " *read* " definition ".

,, 193 ,, 8 from bottom, *for* " Tungoo " *read* " Toungoo ".

,, 207 ,, 32 from top, *for* " Belladona " *read* " Belladonna ".

,, 224 ,, 8 from top, *for* " magisterial " *read* " magistral ".

,, 250 ,, 23 from top, *for* " renowed " *read* " renowned ".

,, 262 ,, 2 from top, *for* " exaggerted " *read* " exaggerated ".

,, 280 ,, 28 from top, *for* " which " *read* " much ".

,, 286, penultimate line, *for* " either " *read* " ether ".

,, 287, line 31 from top, *for* " implicity " *read* " implicitly ".

,, 298 ,, 10 from bottom, *for* " and research " *read* " and secondly Research ".

,, 300 ,, 15 from bottom, *for* " weired " *read* " weird ".

,, 300 ,, 5 from bottom, *for* " Pharmacoppoeial " *read* " Pharmacopœial ".

,, 302 ,, 24 from top, *for* " Asafetida . . . (27) " *read* " Asafetida . . . (3) ".

,, 302 ,, 11 from bottom, *for* " Santonnum . . . (3) " *read* " Santoninum . . . (27) ".

,, 302 footnote, line 4, *for* " complaint " *read* " complaints ".

,, 303, line 22 from bottom, *for* " Sodii-phospas " *read* " Sodii-phosphas ".

,, 304 ,, 17 from top, *for* " carcarae " *read* " cascaræ ".

,, 305 ,, 4 from top, *for* " camporae " *read* " camphoræ ".

,, 315 ,, 4 from top, *for* " developes " *read* " develops ".

,, 317, last line, *for* " Balea-Liq " *read* " Belæ-Liq ".

,, 320, penultimate line, *for* " Chemists to whom " *read* " Chemists whom ".

,, 327, line 18 from bottom, *for* " Urotropin " *read* " Urotropine ".

,, 327 ,, 13 from bottom, *for* " Bactrophage " *read* " bacteriophage ".

,, 354, lines 24 and 25 from bottom, *for* " (Here I beg . . . Allopaths) " *substitute*, in continuation of previous sentence, " preparation they greatly differ in quality from those things used by Allopaths ".

Page 357, line 19 from top, *delete* " of ".

,, 385 ,, 17 from bottom, *for* " to " before Dehra Dun *read* " in ".

,, 394 ,, 27 from top, *for* " Ammonia " *read* " Ammonium ".

,, 409 ,, 2 of Appendix I, *for* " bp " *read* " up ".

,, 409 ,, 9 of Appendix I, *for* " Advanced depote " *read* " Advanced depots ".

, 409, Appendix II, heading of column 2, *for* " Number of idents " *read* " Number of indents ".

,, 431, line 37 from top, *for* " bar " *read* " bark ".

PART I.—REPORT.

REPORT OF THE DRUGS ENQUIRY COMMITTEE, 1930-31

PART I.—REPORT

SECTION I.—INTRODUCTORY

CHAPTER I

Genesis of the Committee

On the 9th of March 1927, the Hon'ble Sir Haroon Jaffer moved a Resolution in the Council of State "recommending to the Governor-General in Council to take immediate measures to control the craze for medicinal drugs by legislation for standardization of the preparation and sale of such drugs." He pointed out that the market was being flooded by many unscrupulous traders with drugs and chemicals of defective strength and impure quality and that potent remedies like sera and vaccines were being freely sold to the public, without their quality being tested, and "boosted up by so-called unsolicited testimonials from non-existent individuals." He characterized the practice as a great menace to the public health and called for the prompt intervention of the State, by the institution of efficient safeguards, to ensure the quality and the authenticity of the medicinal preparations offered for sale to the public. The Hon'ble Sir Maneckji Dadabhoy was for urging the Provincial Governments to take the requisite steps to remedy the evil and proposed an amendment to that effect. The discussion that followed revealed a general consensus of opinion in favour of a comprehensive check on the sale and manufacture of drugs in this country including the standardization of drugs and the assay of sera and vaccines. The necessity for the introduction of some sort of control over the import of Patent medicines and their advertisements also found strong support. Major-General T. H. Symons, the then Director-General, Indian Medical Service, among others, expressed concurrence with the view that steps should be taken to see that the drugs manufactured or sold in India should be "standardized in some form or other." The Council of State eventually adopted the Resolution in the following terms:—

> This council recommends to the Governor-General in Council to urge all Provincial Governments to take such steps as may be necessary to control the indiscriminate use of medicinal drugs and to legislate for the standardization of the preparation and for the sale of such drugs.

2. In the Legislative Assembly, the demand for the control of adulterated drugs was insistently pressed by Lieut.-Col. H. A. J. Gidney. On the 4th of September 1928, he went so far as to move for leave to adjourn the House for the consideration of what he described as the *gigantic quinine fraud.* He stressed the fact that India was *par excellence* the dumping ground for every variety of quack medicines and adulterated drugs manufactured in all parts of the world and that her markets were glutted with useless and deleterious drugs sold by unqualified chemists, who were themselves a public danger, and pleaded strongly for the immediate introduction of a "Food and Drugs Act" and a "Pharmacy and Poisons Act" to eradicate the existing evils.

3. The commercial community testified to their profound sense of the gravity of the situation by the institution of prosecutions against certain fraudulent vendors of drugs and chemicals in courts of law in 1927, which, however, did not meet with much success. Their formal protest against the uncontrolled sale of inferior and adulterated drugs and their demand for necessary legislation found expression in a letter which the Secretary of the Indian Merchants' Chamber of Bombay addressed to the Government of India on the 3rd of May 1928. The letter stated that "the attention of the Committee of this Chamber has been drawn to the practice followed by a large number of chemists and druggists in India of stocking drugs of inferior quality for sale. This has affected the pharmaceutical industry to a great extent. Some of the manufacturers, who do not possess a properly equipped laboratory and who can hardly be called manufacturers, are turning out inferior qualities for purpose of increasing their sale. This is calculated to do great harm to the industry which is still in its infancy and will bring it a bad name in course of time. The progress of the pharmaceutical industry will be greatly hampered unless some measures are immediately taken to deal with malpractices prevalent in business. In every civilized country, the sale of foods and drugs is controlled by law; but, here in India, there being no such restriction, the dealers in drugs are able to stock any quality they like. That there is considerable demand in India for the cheapest kind of drugs is generally admitted, and for this reason my Committee are of opinion that the introduction of a Food and Drugs Act in this country would be desirable from the point of view of both dealers and consumers, as some continental and English firms are known to make a practice of wilfully adulterating their goods for shipment into India in response to trade demands for such goods."

4. Public opinion also expressed itself in no uncertain or equivocal terms. Medical and scientific journals of undisputed competency and authority took up the question in all earnestness. In the *Indian Medical Gazette* of 1927, Major-General Megaw drew the picture of India in lurid colours as "a land of quacks, quack traders, quack medicine mongers, etc." The *Indian and Eastern Druggist* and the *Pharmaceutical Journal* of England lent

their warm support to the agitation. Leading newspapers like the *Statesman* and the *Civil and Military Gazette* vigorously championed the need for legislative interference to protect the masses from the perils of the situation. The Medical Research Workers' Conference, held as far back as December 1926, passed a Resolution drawing the attention of the Government to the urgent necessity for an organization to standardize the drugs issued by the Medical Stores. In their next annual session, the Conference reiterated their demand for standardization in an amplified form including in its scope not only the drugs issued through the Medical Stores, but also the testing and standardization of drugs in common use and the setting up of a laboratory for this purpose. The discussion at the Sixth Annual Session of the Conference of December 1928 centered round the question of the nature of such a laboratory and its location, and the Conference ultimately adopted a Resolution recommending the appointment of a committee of experts to investigate the feasibility of the formation of a laboratory for the standardization of drugs and to examine the question in all its bearings with a view to defining the scope of such an institution and, if possible, expressing the opinion as to the suitability or otherwise of the Central Research Institute at Kasauli for its location. The presidential address before the Medical and Veterinary Section of the Indian Science Congress, held at Lahore in 1927, also contained a strong appeal for energetic steps to counteract the evil of spurious drugs.

5. In response to this volume of opinion—representative of all shades of thought, medical, commercial and lay—the Government of India, on the 8th of March 1929, addressed a letter to the Local Governments explaining the nature of the problem of drug control and inviting their views on the suggestion of appointing a small *ad hoc* committee to explore and define the scope of the problem with reference to actualities and to make recommendations as to the measures which were necessary to arrive at a satisfactory solution. The majority of the Local Governments agreed to the appointment of the committee. Thereupon, the Government of India, Department of Education, Health and Lands, issued the following Resolution, dated the 11th of August 1930, appointing the present committee:—

No. 1637.—In pursuance of a Resolution which was adopted by the Council of State in March 1927, recommending the Governor-General in Council to urge all Provincial Governments to take such steps as may be possible to control the indiscriminate use of medicinal drugs and to legislate for the standardization of the preparation and for the sale of such drugs, the Government of India, after consulting and with the approval of Local Governments, have decided to appoint a small committee to explore and define the scope of the problem, and to make recommendations as to the measures which should be taken.

2. The terms of reference to the Committee will be as follows:—

(1) To enquire into the extent to which drugs and chemicals of impure quality or defective strength, particularly those recognized by the British

Pharmacopœia, are imported, manufactured or sold in British India, and the necessity, in the public interest, of controlling such importation, manufacture and sale, and to make recommendations;

(2) To report how far the recommendations made in (1) may be extended to known and approved medicinal preparations other than those referred to above, and to medicines made from indigenous drugs and chemicals; and

(3) To enquire into the necessity of legislation to restrict the profession of pharmacy to duly qualified persons, and to make recommendations.

3. The Committee will be composed as follows:—

Chairman.

1. Lieut.-Col. R. N. Chopra, M.A., M.D. (Cantab.), L.R.C.P. (London), M.R.C.S., (Eng.), I.M.S., Professor of Pharmacology, School of Tropical Medicine and Hygiene, Calcutta.

Members.

2. Rev. Fr. J. F. Caius, S.J., Pharmacologist at the Haffkine Institute, Bombay.

3. Mr. H. Cooper, PH.C., F.C.S., of Messrs. Smith Stanistreet & Co., Ltd., Manufacturing Chemists, Calcutta.

4. Maulvi Abdul Matin Chaudhury, M.L.A.

A Secretary whose name will be announced later. [Mr. C. Govindan Nayar, B.A., B.L., Barrister-at-Law, of the Madras Judicial Service, and Under Secretary to the Government of Madras, Law (Drafting) Department, was subsequently appointed Secretary.]

4. The Committee will have the power to co-opt members when necessary. It will visit important centres in the Provinces and will take evidence on the questions stated in the terms of reference. It will also issue a questionnaire to selected persons and bodies. Persons who desire to be called as witnesses or to receive copies of the questionnaire should apply in writing to the Secretary of the Committee, care of Lieutenant-Colonel Chopra, I.M.S., the Chairman of the Committee, School of Tropical Medicine and Hygiene, Calcutta, giving their full names and addresses, together with a brief memorandum of the points in regard to which they desire to give evidence. It will rest with the Committee to decide what oral evidence should be taken.

CHAPTER II

The aim and scope of the Enquiry

6. The terms of reference to the Committee embodied in Resolution No. 1637 of the Government of India, consist of three distinct heads, namely, (1) control over drugs and chemicals recognized by the British Pharmacopœia, (2) control over (*a*) known and approved medicinal preparations other than those recognized by the British Pharmacopœia, and (*b*) medicines made from indigenous drugs and chemicals, and (3) control over the profession of pharmacy. To clarify the position, a few words as to how the terms of reference have been interpreted by the Committee would not seem to be out of place.

7. The first head does not give rise to much difficulty. It may, however, be mentioned that the British Pharmacopœia*, now extant, was prepared so long ago as 1914 with the result that many

* British Pharmacopœia is a publication by the General Council of Medical Education and Registration of the United Kingdom under the statutory authority of the Medical Act, 1858 (21 & 22 Vict c 90) and the Medical Council Act, 1862 (25 & 26 Vict. c. 91)

of the drugs which have since received recognition are not included in it. It follows that, strictly speaking, the enquiry under the first head of reference should be confined to pharmacopœial medicines. This would exclude the consideration of many well-known drugs, such as emetine, arsphenamine, carbon tetrachloride, etc., which would undoubtedly find a place in the future editions of the British Pharmacopœia. Almost the entire body of what are commonly called biological products, such as vaccines and sera, some of which are covered by the Therapeutic Substances Act, 1925, would also fall out of the purview of this head. Similar is the case with organo-metallic compounds, such as the organic preparations of arsenic and antimony.

8. The second head of reference is, however, very wide and comprehensive and is calculated to take in all the recognized chemicals and drugs inclusive of biological products and organo-metallic compounds which are not covered by the first head. The words " known and approved " apparently correspond to the expression " known, admitted and approved " used in the exemption clause of the Schedule to the Medicines Stamp Act, 1812. The books of reference recognized under the " known, admitted and approved " clause of the Medicines Stamp Act include the British Pharmacopœia (B.P.), the British Pharmaceutical Codex (B.P.C.), " Pharmaceutical Formulas " (P.F.), the "Pharmaceutical Journal Formulary " (P.J.F.), the Chemist and Druggist Diary, Martindale's "Extra Pharmacopœia ", and Squire's " Companion to the British Pharmacopœia." The formulæ published in these are accepted as "known, admitted and approved " and will, therefore, be comprised in the description " known and approved " in the terms of reference to the Committee.

9. Then there are others of which the composition is either kept secret, or, though disclosed, cannot be regarded as approved. These will not legitimately fall within the category of " known and approved " medicines. But they have such sway and popularity that our treatment of drugs would lack in completeness if we failed to deal with them. Question No. 9 of our questionnaire was directed to an enquiry in regard to them and a large mass of evidence has accordingly been collected.

10. The expression "Indigenous drugs " is generally used in the wide sense of including not only those drugs which were originally natives of, or which belonged naturally to, India, but also those which have been introduced into India and have become completely naturalized. Hence, the term may be taken as being practically equivalent to drugs which grow or are cultivated in India. Such drugs may be used both in the pharmacopœias of the various Western countries and in the indigenous systems of treatment in India. That fact does not make any difference in its interpretation.

11. Of the medicines made from indigenous drugs, some are included in the British Pharmacopœia. Some are comprehended by the expression "known and proved medicines." To the extent that they are included in the British Pharmacopœia or fall within the description "known and approved" medicines, they are covered by the heads of reference 1 and 2 (*a*). Then there remain those drugs and medicinal preparations of indigenous character which do not fall under either of the above groups, such as those generally used in the indigenous systems of medicines in vogue in India.

12. The result is that the heads of reference 1 and 2 taken together exhaust all the chemicals and drugs in use in the different systems of medicine in force in India. Thus, the object of the enquiry is primarily to investigate into the necessity for the control of the drugs recognized by the British Pharmacopœia, whether indigenous to India or not, and then to examine to what extent the recommendations in regard to them may be extended to other chemicals and drugs, which are either known and approved (irrespective of their indigenous character) or are indigenous in the restricted sense referred to above.

13. The third branch of the enquiry relates to pharmacy. In its modern sense "pharmacy" is applied to the act of preparing, preserving and compounding medicines according to the prescriptions of physicians. The profession of pharmacy as understood in England includes two distinct classes of persons between whom it is necessary to discriminate—the ordinary chemists and druggists, and the superior pharmaceutical chemists with high qualifications in botany and chemistry and allied subjects, who are conversant with the properties of drugs and are competent to detect adulterations and impurities in them and to perform analysis of all kinds. In its wider sense the business of a chemist and druggist consists in keeping open shop for buying, preparing, compounding, dispensing and vending drugs, medicines and medicinal compounds. Pharmacy is still in its infancy in India and the profession has not been organized or placed upon any definite basis. The question of restricting the profession of pharmacy to qualified persons and the laying down of the qualifications, statutorily or otherwise, will fall under the third head.

14. Consequent on a request made to them by the Government of Bombay, in their letter No. 7964-D, dated the 2nd August 1930, the Government of India expressed the view that the Committee should examine the question of amending the Bombay Prevention of Adulteration Act, 1925, so as to make it applicable to drugs as well, in case the Committee had no objection to such a course, and had time to consider the matter. The Committee agreed to do so.

15. The compliance with the request of the Government of Bombay does not materially widen the ambit of the enquiry. It does not bring the control over foods within our purview. The

request of the Government of Bombay merely amounts to a suggestion to consider the advisability of incorporating drugs along with foods in the Bombay Prevention of Adulteration Act, so as to make the provisions relating to the latter applicable to drugs also. There is no desire that the Committee should consider or examine the question of control over foods or the adequacy of the provisions of the Act to effectuate it. The result is that, notwithstanding the compliance with the request of the Government of Bombay, the scope of the enquiry remains unchanged and is confined to a consideration of the control over drugs and pharmacy.

CHAPTER III

Importance of the Enquiry

16. The term 'drug' covers an enormous field of human enterprise. From remotest times man has looked to this source for remedies to alleviate his ills. The evolution of drugs is traced to the desire of man to seek means to overcome personal discomfort and disease. In course of time the knowledge of drugs and with it their number and use have gradually increased. The number of those introduced by modern experimental methods has been particularly large. It is too late in the day to hark back to the period when the decoction from a few herbs or the juice of a fresh plant served the purpose of a drug. The progress of the world has created a necessity for more elaborate drugs which have come to stay.

17. For the production of pure drugs, high scientific attainments, expert knowledge and intense application are necessary. This is not a work for the amateur. What would lead to mere financial loss in other concerns would, in the case of drugs, take a heavy toll of human life. In all civilized countries, the greatest care is taken for the preparation of drugs according to established standards, and authoritative publications are issued as guides. It follows that it is the duty of the State to ensure that drugs are only produced under the very best conditions. The importance of obtaining pure drugs of proper strength and quality cannot be overestimated.

18. There always has been, and certainly there still is among certain people, a feeling that, wherever man has settled, nature has provided a remedy for his disease, if only it could be discovered. What a number of tentative trials must have been made—many with distinctly unpleasant results, and some, undoubtedly, with fatal results—before man attained to his present state of knowledge! Although modern science has opened up new sources of remedies, reliance is still placed to a great extent upon plant life for the supply of drugs. Many are collected from their original wild sources, the forests, plains and hills of all parts of the world. These sources are obviously uncertain as seasons vary, and sometimes a particular plant, very common in a certain district, disappears

gradually for no apparent reason. To counteract this, plants for which there was a large demand began to be cultivated. Research also showed that proper cultivation improved the properties of herbs and increased their active principles. At the present time, many of the medicinal plants are carefully cultivated and a great deal of scientific study has been bestowed on the subject. There are, of course, some which, owing to their universal distribution, their rapid reproduction and the paucity of demand for them, will never repay the cost of cultivation.

19. Drugs, even after collection, offer further problems. They must be dried and prepared for the market with the greatest care and attention. Carelessness in this operation will result in the destruction of their properties, either by fermentation, overheating, or otherwise. The next process of storage requires equal care to avoid deterioration. They may develop fungus or undergo subsequent fermentation or be attacked by insects. Drugs are not ready for use even after proper collection, drying and storage. Active principles, when required *as such*, have to be extracted and preparations, such as tinctures, liquid or solid extracts, pills, powders, etc., have to be made before that stage is reached. Here again, absence of care and proper attention requiring experience, skill and scientific knowledge, will prejudicially affect the activity of the product.

20. Another group of drugs known as chemicals offers entirely different problems. Many chemical compounds are produced by natural processes at ordinary temperatures and pressures by plants. To artificially produce similar compounds, the chemist has, however, to resort to powerful reagents such as strong acids and alkalis, large variations in temperature and pressure, distillation, fusion and many other drastic operations. Many of the products of the chemist are similar in action and composition to natural compounds, but are cheaper to produce. Other chemicals belonging to the inorganic class are produced from natural minerals, sometimes by very simple processes and at other times by complicated ones. Before these can be used for medicinal purposes, a certain amount of purity and freedom from admixture with other substances is necessary for the prevention of harm. Standards of purity have, therefore, been laid down for such chemicals.

21. Then there are comparatively recent remedial agents obtained by various chemical operations, mainly from coal tar, as well as other products obtained by more or less complicated processes of synthesis. There are also the so-called organo-metallic compounds which form a powerful and important group. These compounds have to be prepared with extreme care, as many of them would be positively dangerous, if not fatal, unless they are in a state of absolute purity. Packing and storage of these compounds have to be done under special conditions to avoid deterioration or to prevent the substance becoming definitely poisonous.

22. Biological products, such as vaccines, sera, gland products, etc., form another group of remedial agents. They require even greater skill and more expert scientific knowledge than any other type of preparation used in medicine. Living bacteria—the cause of some of the most deadly diseases—are the " raw material " from which these are produced. The slightest error or carelessness on the part of the operator preparing them may result in incalculable amount of harm. The collection of the material has to be made under very strict supervision to ensure that the animals from which it is obtained are not in any way diseased. The active principles, many of which have not been identified or isolated, are so delicate that any mistake in the preparation would destroy them and render the product inert. Efficient control over the manufacture of such products was considered to be so important that the Medical Research Committee in England requested the Government in 1916 to take steps for the exercise of it. The absence of any control was said to be ' a source of very grave danger to the country.' The Health Committee of the League of Nations investigated the question of control and laid down universal standards for some of them. Definite agreement between various nations was reached with reference to seven of these products, and provision was made for the preparation and preservation in some State institutions of an international standard of reference. Great Britain assumed responsibility for Insulin. In England, the manufacture of these products is controlled by the Therapeutic Substances Act of 1925 and, in other European countries and in the United States of America, there is comprehensive legislation.

23. Drugs obtained by import may next be dealt with. They form by far the largest proportion of those used by the practitioners of the Western system. A large number of these substances cannot under present conditions be prepared in India and the country instead of depending on its own resources for treatment of the maladies of its inhabitants has, therefore, to turn to extraneous sources. With the spread of education and with the adoption of modern scientific methods of treatment, the popularity of the Western system is increasing daily and import of drugs from abroad has received a great impetus of late years. They chiefly come from different European countries and the United States of America, but lately there has been a certain amount imported from Japan. Imported drugs are generally distributed direct by special agents, who are sometimes special representatives of the foreign firms or agents of wholesale dealers already established in the country. The extent to which imported medicines are used in India may be gauged from the following tables.

TABLE No. I

Drugs and Medicines (excluding Chemicals and Narcotics) imported into India during five years from 1924–25 to 1928–29.

Names of drugs imported.	Quantity.					Value in rupees.				
	1924–25.	1925–26.	1926–27.	1927–28.	1928–29.	1924–25.	1925–26.	1926–27.	1927–28.	1928–29.
Aloes— cwt.	1,961	547	2,375	1,004	..	37,218	12,394	67,792	25,543	Included in drugs of other sorts.
Asafœtida— Cwt.	6,335	2,719	3,947	3,236	3,612	3,77,005	1,86,642	1,57,412	1,14,532	2,08,343
Camphor— lb.	907,150	993,007	1,401,695	1,373,731	1,612,356	23,02,563	21,47,341	27,96,850	25,92,177	27,79,631
Cocaine— oz.	747	1,334	551	1,157	1,259	11,082	20,737	11,636	17,622	18,476
Cod Liver Oil— lb.	..	84,827	66,857	75,638	90,602	..	1,50,097	1,22,733	99,435	1,30,796
Morphia and Preparations of Opium—oz.	640	687	1,090	1,111	1,800	47,447	64,312	1,05,262	1,34,919	1,36,564
Quinine and Salts— lb.	107,523	130,459	119,567	113,637	133,795	28,08,734	30,96,160	26,25,239	23,42,186	24,47,075
Sarsaparilla and preparations.	..	..	..	..	..	40,659	43,185	24,321	37,307	..
Storax ..	111,762	130,753	94,455	110,899	..	31,566	34,297	28,974	29,775	..
Saccharine ..	..	..	..	..	29,612	..	..	..	..	1,12,652
Proprietary and Patent Medicines.	..	..	..	..	..	25,06,303	24,15,232	27,29,228	29,26,782	42,83,667
Other sorts of Drugs and Medicines.	..	..	..	..	..	87,88,830	91,30,150	1,03,03,590	1,14,38,753	1,00,95,756
Total ..	..	..	..	..	..	1,69,64,005	1,73,11,020	1,90,02,128	1,98,28,068	2,02,12,960

TABLE No. II

Drugs and Medicines (excluding Chemicals and Narcotics) exported from India during five years from 1924-25 to 1928-29.

Names of drugs exported.	Quantity.					Value in rupees.				
	1924-25.	1925-26.	1926-27	1927-28.	1928-29.	1924-25.	1925-26.	1926-27.	1927-28.	1928-29..
Asafœtida— cwt.	9	54	65	..	..	1,783	2,953	4,219	735	..
Camphor— lb.	1,382	16	..	100	..	1,425	80	..	175	..
Cinchona bark —lb.	559,592	486,187	80,691	173,529	138,104	2,12,712	2,45,398	43,460	90,002	78,024
Galangal— cwt.	188	519	536	633	575	5,157	12,662	11,915	14,096	12,850
Nux Vomica— cwt.	30,258	44,079	54,347	50,702	43,212	2,27,836	2,96,091	3,48,653	3,27,858	3,03,208
Senna— cwt.	47,544	44,995	49,117	52,814	46,995	10,74,678	8,93,052	8,93,052	9,48,812	8,60,208
Other sorts of Drugs.	..	..	..	..	..	19,83,384	2,22,711	24,03,426	20,11,689	29,06,142
Total Drugs and Medicines.	..	..	..	..	..	35,87,425	36,77,347	37,10,220	34,53,367	41,60,988
Tea dust for manufacture of Caffeine— lb.	3,239,907	3,000,969	1,591,330	4,114,638	..	4,90,644	5,50,983	2,63,810	4,41,671	..

24. In 1908–09, the value of drugs exported from India amounted to Rs. 15·5 lakhs against imports which amounted to 73·0 lakhs. In 1928-29, the export and import values of drugs were respectively Rs. 41·6 and 202·12 lakhs. This would show the remarkable extent to which trade has increased and would, *prima facie*, appear to represent a very satisfactory state of affairs. A closer scrutiny, however, reveals that the imports are proportionately very much larger than the exports. This means that, while much raw material is going out of the country, very considerable quantities of refined preparations manufactured in foreign countries are coming into India. Many of the imported drugs are standardized pharmacopœial preparations, such as galenicals and purified alkaloids, in many cases manufactured from crude drugs which have been exported. Besides these, there is a large import of proprietary and patent preparations. A perusal of the import table shows that over Rs. 100·9 lakhs worth of the former group under the heading of " other sorts of drugs and medicines " and 42·8 lakhs worth of proprietary preparations were imported in 1928–29. Proprietary and Patent medicines have shown a phenomenal increase during the last five years, i.e., from about 25·0 to 42·8 lakhs. The figure showing pharmacopœial preparations and chemicals has risen from 87·8 to 114·3 lakhs in 1927–28, but showed a slight decrease to 100·9 lakhs in 1928-29, probably due to the development of the drug industry in the country. Quinine and its salts have decreased from 28·08 lakhs to 24·47 lakhs during the last five years.

25. If we now turn to the export table (i.e., Table No. II) the outstanding figures are under the heading of " Total drugs and medicines " which show a steady increase from Rs. 35·8 to 41·6 lakhs during the last five years. A perusal of this table shows that the export of cinchona bark has been showing a decrease lately. Whereas in 1924, Rs. 2·12 lakhs worth was exported, in 1928–29, it was only 0·78 lakh.

26. The other source of supply of drugs is local manufacture. If one looks back a few decades, one cannot help remarking the great advance made in this direction. The number of State and private hospitals and charitable dispensaries has increased enormously and a large number of private dispensing establishments have been opened during recent years. Retail and wholesale drug stores have sprung up in all towns. At the beginning of this century, there were only two or three firms manufacturing drugs in the whole of India; now Calcutta alone can boast of half a dozen large factories. Formerly, a considerable proportion of this business consisted of diluting solid extracts of drugs imported from Europe, but now most of the drugs are manufactured in this country; few only of the drugs indigenous to India were used in the manufacture of B.P. preparations or galenicals, but now most of the firms use indigenous raw materials.

27. No official statistics are available for drugs which are being manufactured in India. The following table has been compiled from the replies to the questionnaire we have received and it probably furnishes the most complete estimate so far prepared.

	Designation.	Assam.	Bengal.	Bombay.	Behar and Orissa.	Burma.	Central Provinces.	Madras.	North west Frontier Provinces.	Punjab.	United Provinces.	Totals.
a	Tinctures and spirituous preparations.	200	83,500	38,000	..	300	..	27,000	..	4,000	..	153,000 gallons.
b	Liquid extracts ..	..	18,800	2,000	..	120	..	2,000	..	200	..	23,120 gallons.
c	Solid extracts ..	..	7,000	1,750	..	..	..	600	..	..	..	9,350 lb.
d	Mineral acids ..	..	3,800	2,000	..	..	..	..	..	..	..	5,800 tons.
e	Inorganic chemicals.	..	2,400	2,500	..	..	..	7,250	..	..	..	4,903 tons.
f	Organic chemicals.	..	..	..	..	..	..	35	..	..	..	35 lb.
g	Alkaloids	..	5,800	..	..	..	..	..	..	..	..	5,800 lb.
h	Organo-metallic compounds.	..	27,000	..	..	..	..	..	..	..	..	27,000 grammes.
i	Organo-therapeutics.	..	14,000	..	..	..	..	..	..	..	..	14,000 lb.
j	Vaccines and sera.	..	350	..	..	..	..	..	..	..	..	350 litres.
k	Proprietary liquids.	150	27,000	8,000	..	700	..	500	..	..	..	36,350 gallons.
l	Proprietary solids.	750	60,000	3,500	..	1,30,900	..	1,000	..	..	..	196,150 lb.
m	Other liquids .	1,880	95,000	3,80,000	..	..	..	17,900	..	..	..	494,780 gallons.
n	Other solids ..	400	43,000	3,33,000	..	..	..	1,28,000	..	..	..	504,400 lb.

28. From whatever standpoint we view the subject, it is obvious that the collection, manufacture and distribution of drugs, both wholesale and retail, has developed extensively in India. Many imported drugs are also converted into galenical preparations. The figures at our disposal, however, are so very vague that it is quite impossible to classify them.

29. We make no claim as to the accuracy of the following; but, from a consideration of the information at our disposal, we think it is very doubtful if the total value of the drugs and medicines, excluding chemicals and patent and proprietary medicines, manufactured in India at the present time, would exceed Rs. 50 lakhs. Thus, imported medicinal drugs exceed those prepared in the country to a very large extent.

30. The quality of medicinal drugs derived from both the sources used to be good and above reproach until some years ago. They were manufactured exclusively by reputable and reliable firms, who did not allow their preparations to deviate from the standards laid down in the *pharmacopœias* or other authorized publications. During recent years, there has been such loud complaint against the purity, quality and strength of the drugs manufactured, imported or sold in India, that it has resulted in the appointment of this Committee.

31. The question of the purity of drugs and the profession of pharmacy are inter-dependent. In early days in England, the pharmacists as a class were practically mere traders and retail dealers in crude drugs of vegetable and animal origin. With the development of modern medicine and science, which has increased the number of drugs and introduced newer methods of analysis and assay, the realm of pharmacy has also widened considerably. The modern pharmacist of England has an intimate knowledge of the chemical and physical properties of drugs and has the necessary knowledge and skill to deal with them which the modern requirements of science demand of him. He is also conversant with all the phases of development in preventive and curative medicine.

32. The important part which the pharmacists play in relation to drugs need no special emphasis. They are the custodians of drugs. They prepare and compound and sell them. On their efficiency depends the purity of the drugs dealt with by them. Their relation to the practice of medicine in everyday life is intimate. The busy physician, dealing in diagnosis and treatment, has no time at his disposal to dispense his own medicine as he used to do ages ago; the wider scope of medicine as a science also makes it impossible for him to devote himself systematically to the study of pharmacy. In matters of drugs and dispensing, therefore, the physician has to depend entirely on the advice and guidance of the pharmacist. The physician has sometimes to use very potent drugs which require to be handled with most exact and scrupulous care. Skilful dispensing is essential for successful cure.

33. It follows that the efficiency of persons engaged in the exercise of the profession of pharmacy is as important as the purity and conformity to proper standards of drugs and chemicals manufactured, imported or sold in the country.

CHAPTER IV

Procedure

34. Although, as already indicated, the appointment of the Committee was the inevitable outcome of the pressure brought to bear on the Government from different quarters, the motives of the Government were questioned and the Committee itself was viewed with suspicion when it was actually constituted. The distrust found expression in the columns of a section of the press. The appointment of the Committee unfortunately synchronized with a period of intense political unrest in India. The grounds of suspicion were actually voiced by some of the witnesses who surmised it to be a move on the part of the Government to counteract the Congress-campaign of the boycott of British drugs. The fact that it was constituted soon after the inauguration of the campaign to boycott British drugs, the delay of about three years in giving effect to the Resolution of the Council of State, and the alleged absence of any attempt on the part of the Government to develop or encourage the drug industry in India in the past, were relied on in support of this view. Intention to stifle the indigenous drug industry of India and to restrict the Indian market to British drugs, to the exclusion of those of other foreign countries, was openly attributed to the Government. The financial stringency and the supposed unrepresentative character of the legislatures were stressed to show that the appointment of the Committee at this juncture was highly inopportune and ill-advised. The Committee are, however, glad to be able to report that this opposition and hostility was deservedly short-lived and merely represented a transient phase which speedily gave way to generous and whole-hearted co-operation from every section of the public and of the medical profession in particular. Soon after the Committee began to function, its true objects and perspective made themselves felt and disarmed opposition. The unfounded suspicions happily vanished without leaving any trace of bitterness behind and the greatest harmony and the most perfect understanding and confidence have ever since continued to characterize the relations of the Committee with the public.

35. Though the Resolution appointing the Committee was notified on the 11th of August 1930, the Committee could not assemble before the 1st of October 1930. There was some delay in the appointment of the Secretary who took charge only on that date. But, all this was not allowed to hinder or postpone the preliminary work of the Committee. A large amount of correspondence was carried on by the Chairman with the object of gaining

information calculated to throw light on the work of the Committee. The careful preparation of the questionnaires for eliciting evidence, on which the success of any Committee must depend, was also promptly taken in hand by him in the midst of his other onerous duties. In this task, he was assisted by one of the members, Mr. Cooper, who interested himself in the work of the Committee long before he formally joined it. Several sets of questions extending over the entire field of enquiry were framed, some general in character, while others concerned the different professions exclusively, such as the medical profession, manufacturers of drugs and chemicals, importers and dealers and dispensing chemists. The Chairman kept himself in touch with the other members, Reverend Father Caius and Maulvi Abdul Matin Chaudhury, and obtained their approval to the questions prepared by him in collaboration with Mr. Cooper. There were 38 questions in all and as many as 1,963 questionnaires were issued during the period that preceded the 1st of October 1930. Some of them were despatched early in September. The promptitude in the preparation and despatch of the questionnaires facilitated the course of the enquiry greatly. For one thing, it enabled the Committee to start on its tour early in October as the witnesses had by then sufficient time to study the questions in all their aspects and bearings and formulate their answers and proposals.

36. The entire Committee formally set to work on the 1st of October 1930. Questionnaires were distributed far and wide and no effort was spared to reach the largest number of individuals and bodies interested in the problem with a view to ascertain every view point and to leave no avenue unexplored which would tend to the satisfactory solution of the difficulties which confronted the Committee. Altogther 2,180 questionnaires were issued in India, including the Native States, to medical men and institutions (official and non-official), Councils of medical registration, State Medical Faculties, Medical Faculties of Universities, Chemical Examiners to Governments, Customs and Excise authorities, Directors of Public Health, Railway Medical officers, Public Analysts, medical journals, Ayurvedic physicians, Unani hakeems, drug manufacturers, chemists and druggists and members of the Central and Provincial legislatures. The Military Directorate at the Army headquarters and military medical officers were specially addressed. The response was gratifying. In all, 638 replies were received, namely, 104 from Madras, 85 from Bombay, 123 from Bengal, 90 from the United Provinces, 68 from the Punjab, 39 from Bihar and Orissa, 19 from the Central Provinces, 16 from Assam, 24 from Burma, 11 from the North-West Frontier Province, 11 from Delhi, 2 from Baluchistan, 2 from Nepal, 3 from Central India, 3 from Ajmer-Merwara and 38 from the Indian States. Of these, 527 were from the representatives of the medical profession, 74 from chemists and druggists, 38 from the manufacturers of drugs, 392 from officials and 246 from non-officials.

37. The power to co-opt members in important centres enabled the Committee to secure the assistance of experts specially qualified by local knowledge and experience to contribute to the solution of the problems which engaged its attention. The exercise of the right of co-optation made it possible for the Committee to substantially complement its strength and representative character by including therein eminent medical men and representatives of Indian manufacturing firms. The gentlemen whose names are mentioned below were co-opted as members of the Committee in their respective stations. Each of them, with the exception of one, furnished the Committee with a memorandum containing his views on the points investigated at the enquiry. The Committee acknowledge their indebtedness and gratitude to all of them for the extremely valuable and material assistance which they rendered at considerable personal inconvenience and self-sacrifice:—

Madras

1. Rao Sahib Dr. U. Rama Rao, medical practitioner.

2. A. Selvanayagam, Esq., M.P.S. (India), elected by the Pharmaceutical Society of India (Madras).

Lucknow

Dr. B. N. Vyas, head of the Department of Pharmacology, King George Medical College.

Lahore

1. Colonel C. R. Bakhle, C.I.E., I.M.S. (Retired).
2. Dr. B. J. Sahni, M.B.B.S., manufacturing chemist.

} Elected by the Lahore Medical Union.

Calcutta

1. Dr. P. Nandi, M.D., Professor of Medicine, Carmichael Medical College.

2. S. Sen, Esq., M.SC., Factory Superintendent, Messrs. Bengal Chemical and Pharmaceutical Works, Limited.

3. Dr. Kartic Ch. Bose, M.B., of Doctor Bose's Laboratories, Limited.

Bombay

1. Dr. Jivraj N. Mehta, M.D., M.R.C.P. (Lond.), Dean, S.G.S. Medical College (elected by the Bombay Medical Union).

2. M. Venkat Rao, Esq., J.P., of Powell & Co., Lamington Road (nominated by the Bombay Chemists' and Druggists' Association)

38. The Committee held sittings, examined witnesses and visited the institutions as mentioned in the subjoined table. The witnesses were drawn from those to whom the questionnaires had been sent.

Provinces.	Places of sittings.	Dates of sittings.	Witnesses examined.		Institutions visited.
			Official.	Non-official.	
Madras ..	Madras ..	17th, 18th, 23rd and 25th October.	19	11	The King Institute of Preventive Medicine, The Government Medical Stores and The Medical College.
	Bangalore.	20th and 21st October.	4	2	The Indian Institute of Science.
	Vizagapatam.	27th October.	10	1	The Medical College.
The United Provinces.	Benares ..	3rd and 4th November.	6	8	The Benares Raj Hospital, and The Hindu University.
	Ghazipur.	5th November.	2	..	The Opium Factory.
	Lucknow.	7th and 8th November.	13	6	
	Dehra Dun.	25th November.	..	..	The Forest Research Institute.
	Meerut ..	26th January 1931.	4	5	
	Agra ..	27th and 28th January.	5	3	
	Cawnpore.	29th January	2	3	
	Allahabad.	31st January.	3	2	
The Punjab.	Amritsar ..	10th and 11th November 1930.	9	12	The Amritsar Distillery and The Standard Chemical Company.
	Rawalpindi.	12th and 13th November 1930.	7	9	Messrs. Jagat Singh & Sons.
	Lahore ..	18th and 22nd November.	12	21	The Punjab Pharmaceutical Works, The Dayanand Ayurvedic College, The Factory of Messrs. Jagat Singh & Bros. and the laboratory of the Chemical Examiner to Government.
Bengal	Calcutta ..	1st, 6th, 10th, 13th and 17th/18th December.	17	49	The Bengal Chemical and Pharmaceutical Works Limited, The Government Test House, Messrs. Smith Stanistreet & Co. Limited, Dr. Bose's Laboratories, Limited and B. K. Paul & Co.
	Dacca ..	8th December.	5	5	The Dacca National Medical School.
The North-West Frontier Province.	Peshawar..	14th November.	5	5	
Bihar and Orissa.	Patna ..	15th and 16th December.	10	5	

Provinces.	Places of sittings.	Dates of sittings.	Witnesses examined.		Institutions visited.
			Official.	Non-official.	
The Central Provinces.	Nagpur ..	3rd January 1931.	4	2	
	Jubbulpore.	2nd February 1931.	2	4	
Bombay ..	Bombay ..	5th, 9th, 12th and 13th January 1931.	10	32	
	Poona ..	10th January 1931.	5	2	
	Ahmedabad.	14th January 1931.	2	2	
	Karachi ..	17th and 19th January.	5	7	The Chemical Analyser's Laboratory.
Delhi ..	Delhi ..	22nd and 24th January.	3	12	The Research Laboratory, A. and U. Tibbi College.

39. The Committee has thus received a large mass of varied and voluminous evidence, both written and oral. It has heard a very wide range of opinions on both the medical and the commercial sides of the problems. Burma was excluded from the scope of the itinerary at the suggestion of the Government of India and Assam was not visited as the Local Government stated that no advantage would be gained by a visit to that province. The thanks of the Committee are due to the witnesses for their cordial co-operation and the readiness with which they placed at the disposal of the Committee all the resources of their knowledge. Many of them also favoured the Committee with special memoranda on certain specific aspects of the problem.

40. The Committee desires to record its appreciation of the help it received from the Local Governments. The work of the Committee was materially facilitated by the excellent arrangements made to secure the attendance of the witnesses and to provide accommodation for the office and the staff and, in some cases, of the Members of the Committee also.

41. The Committee feels it only right to place on record that the enquiry and the drafting of the report were conducted under great stress and pressure. The period of six months fixed by the Government of India did not bear any proportion to the magnitude of the task or to the extent and the complexity of the problems which the Committee had to deal with. From the very commencement, the Committee had to race against time and undertake incessant tours in utter disregard of the strain and hardship caused thereby. But for the foresight of the Chairman in settling and issuing the questionnaire, even before the Committee had formally assembled, the period of six months would have been undoubtedly exceeded. Much as the Committee would have liked to submit their report and the appendices attached to it in print,

the limitations of time have compelled it reluctantly to leave that part of the work unfinished and to present it in manuscript. In this connexion, the Committee regrets to state that the Chairman's illness which necessitated his taking leave for five weeks deprived it of the benefit of his guidance for that period. But, during this interval, the work was not allowed to be interrupted in any manner and his place was filled by the Reverend Father Caius.

42. The Committee was fortunate in securing the services of Mr. C. Govindan Nayar as Secretary. His profound legal knowledge and his vast experience of drafting work have been invaluable and have materially helped us in the submission of the report within the fixed time. His efficient management of the office has greatly facilitated the smooth working of the Committee everywhere. We wish to record our sense of high appreciation of the services rendered by him. To Dr. B. Mukherji, the Assistant Secretary, we are indebted for the ability, care and readiness with which he discharged his duties. Mr. Haqiqat Rai, the Head Clerk, and the other members of the staff also deserve our thanks for services of the highest quality rendered cheerfully and ungrudgingly under conditions of great strain and physical discomfort.

SECTION II.—EXISTING LEGISLATION

43. For purposes of administration; British India is mainly divided into nine "Governor's Provinces"—the Presidencies of Bengal, Bombay and Madras and the Provinces of Bihar and Orissa, the United Provinces, the Punjab, the Central Provinces (to which Berar is attached), Assam and Burma—and six Commissionerships—the North-West Frontier Province, British Baluchistan, the Province of Delhi, Ajmer-Merwara, Coorg, and the Andaman and Nicobar Islands. There are also 'Administered Areas' such as the Civil and Military stations of Bangalore, Secunderabad and Mhow controlled by British officers. It is proposed to make a brief survey of the state of the law relating to (1) the control of the manufacture, importation and sale of adulterated drugs and (2) pharmacy, in British India as a whole and in the different subdivisions comprised in it separately. Most of the other countries have realized the necessity for control over drugs and pharmacy and have legislation on the subject. It will, therefore, be instructive to examine the corresponding legislation existing in foreign countries and to note the distinctive features thereof. The Indian States do not appear to have any such legislation? *

CHAPTER I

Drugs

BRITISH INDIA

44. There is no enactment of the Indian Legislature which aims directly at the prevention of adulteration of drugs or which ensures their conformity to proper standards of purity and strength. The Indian Penal Code, the Indian Merchandise Marks Act, 1889, and the Sea Customs Act, 1878, contain some provisions bearing on it. Intentional adulteration of any drug so as to lessen its efficacy or change its operation or to make it noxious and the actual sale of any such drug are penalized by sections 274 and 275, Indian Penal Code, while the sale of a drug as a different drug or preparation is punishable under section 276, Indian Penal Code. The sale of a drug, which is not of the nature, quality or substance demanded by the purchaser, fraudulently, will also amount to cheating under section 415, Indian Penal Code.

45. Section 487 of the Indian Penal Code, introduced by section 3 of the Indian Merchandise Marks Act, is aimed at misbranding and punishes a false mark upon a receptacle containing goods, in a manner reasonably calculated to deceive any person as to the

* For 'British Enactments' in force in Indian States and the 'Administered Areas,' reference may be made to Mr. Macpherson's work on the subject recently revised and brought up to the 31st May 1929, by Mr. G. G. Hooper, I.C.S.

kind, nature or quality, unless absence of intention to defraud is established. Applying a false trade description as well as the sale or exposure for sale of goods with false trade description, in the absence of reasonable care and *bona fides*, are punishable under sections 6 and 7 of the Indian Merchandise Marks Act. ' False trade description ' is untrue description in a material respect as regards the goods to which it is applied. Section 9 of the Indian Merchandise Marks Act provides for the forfeiture of the goods in relation to which the offences are committed. Section 17 declares the existence of an implied warranty on the sale of marked goods. Goods with a false trade description are prohibited from being brought into India by section 18 of the Sea Customs Act and, on importation, are liable to confiscation together with the levy of penalty under section 167 of the said Act. An implied condition that the goods sold shall correspond with the description is also imposed in every sale of goods by section 15 of the Indian Sale of Goods Act, 1930. The breach of the condition will entitle the purchaser to repudiate the contract and claim damages.

46. The Cantonments Act, 1924, extends to all the Cantonments in British India. It empowers the Cantonment authority to enter any shop or place and seize any article of medicine which is adulterated or different from what it is represented to be along with any utensil used for preparing, manufacturing or containing it. If the Health Officer or the Assistant Health Officer is also of the same opinion, the article, if perishable, could be destroyed forthwith. In other cases, the owner or the person in possession of the article is punishable with fine and the article itself liable to forfeiture or destruction.

47. The Poisons Act, 1919, the Opium Act, 1878, and the Dangerous Drugs Act, 1930, though they control the manufacture, importation and sale of certain drugs, do not exercise any precise bearing on the subject of adulteration or standards of strength. They are designed to meet excise and customs requirements and to prevent the illicit use of certain dangerous drugs. The Poisons Act merely regulates the importation, possession, and sale of poisons by the issue of licences therefor. The Opium Act deals with the cultivation of the poppy and the manufacture, possession, transport, import, export and the sale of opium. The Dangerous Drugs Act controls certain operations such as cultivation, manufacture, possession, import, export, transhipment, and sale relating to dangerous drugs as defined therein, in some cases imposing total prohibition and in others providing for compliance with rules and terms of licence. The Sea Customs Act, 1898, and the Indian Tariff Act, 1894, provide for levy of duties on goods, imported or exported, including foods, drinks, drugs, chemicals and medicines.

48. The result is that mere adulteration of drugs is not, by itself, prohibited throughout British India by any enactment. Apart from the commission of the offence of cheating, adulteration which renders the drug ' noxious ' or ' lessens the efficacy ' or ' changes its operation ' alone is controlled by the Indian Penal

Code. Nor is the sale of a drug of insufficient strength or improper standard punishable otherwise than on the basis of misrepresentation and fraud. These expressions are vague and are of inconclusive import. The baneful results of adulteration or defective strength of drugs may be slow and gradual in making themselves evident. The non-existence of fixed standards or methods of analysis, the absence of any precise defination of adulteration, the difficulty of proof and the fact that intention or knowledge is of the essence of these offences, as well as of cheating, complicate the situation and render the provisions ineffective in actual practice. The offences are non-cognizable and no particular trained staff or well-equipped organization or machinery is entrusted with the special duty of keeping vigilant watch over cases of infringements of law and bringing the guilty to book. In penalizing false marks and false trade descriptions, the Indian Merchandise Marks Act and the Sea Customs Act merely touch the fringe of the problem of misbranding which is hydra-headed. Strict proof of difference in the nature or quality of the goods or the falsity of the description is often beset with impediments. As pertinently pointed out by Mr. Niyogi of the Bombay Customs Department, the Acts do not go far enough as they do not in practice operate to prevent the entry of incorrectly labelled preparations but merely require the alteration of the offending label which itself is of doubtful legality. Mr. Stewart, the Collector of Customs, Bombay, has explained that the provisions for confiscation and levy of penalty are rarely enforced. The control is not thus strict and evasion is easy. The provisions have, therefore, naturally remained practically inoperative. The Cantonments Act is also of limited scope and efficacy. Its provisions are equally vague and inadequate and are subject to similar infirmities as those of the Indian Penal Code. The Indian Sale of Goods Act, 1930, which is merely concerned with obligations of a civil nature, and the other Acts already referred to are wholly ineffacious in securing foods and drugs of the opposite standard of strength, purity and quality.

Provinces

49. Although public health is essentially a provincial subject, foods and drugs have not attracted the attention of local legislatures to the extent they deserve. Drugs have fared worse than foods in this respect. The various Municipal Acts of the different Provinces, no doubt, contain provisions of a general character dealing with the subject. Some of them are elaborate, while others are meagre. They prohibit the sale or manufacture of articles of food or drugs different in quality from that demanded by the purchaser or which are unwholesome or adulterated. Most of them leave patent and proprietary medicines and drugs used in indigenous systems of medicines severely alone. Special and comprehensive Acts exclusively devoted to either or both foods and drugs

are of comparatively recent origin. Such Acts in most of the Provinces are modelled on the English Food and Drugs Acts and contain provisions which more or less resemble each other. Even they have failed to take effect or improve the situation to any appreciable extent. The lack of definite standards and tests, the want of skilled experts and the absence of well-equipped laboratories and the requisite facilities to work them have stood as insuperable barriers in their way.

Bengal.

50. The Bengal Municipal Act, 1884, applies to the municipalities in Bengal, other than Calcutta. It deals with foods and drugs* but does not treat them similarly. The Act confers powers of entry and inspection on the Commissioners or those authorized by them and enables them to seize drugs suspected to be adulterated or deteriorated so as to lessen their efficacy, change their operation or render them noxious. While the magistrate could order destruction of the article in the case of both foods and drugs, the infliction of fine on the person in possession is permissible in the case of foods only and not of drugs. There are provisions for the purchase of samples of food for analysis, but none such exists to protect the drugs offered for sale. The Director of Public Health, Bengal, has informed the Committee that, in the absence of standards and machinery for the collection and analysis of samples of foods and drugs, the Act has practically remained a dead letter.

51. The Bengal Food Adulteration Act, 1919, applies to the whole of Bengal, except Calcutta, and is confined to foods. There is no such *ad hoc* legislation in respect of drugs. The Calcutta Municipal Act, 1923, applies to Calcutta only and deals with foods and drugs in a fairly comprehensive manner. It defines the expressions 'adulterated'† and 'misbranded'‡ in relation to foods and

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* Sections 250 to 253 of the Bengal Municipal Act, 1884.

† An article shall be deemed to be 'adulterated' in the case of drugs—

(i) if, when it is sold or exposed for sale under or by a name recognized in the British, German, American or any other Pharmacopœia which the Governor-General in Council, in consultation with the Advisory Board, may specify by notification in the *Gazette of India*, it differs from the standard of strength, quality or purity laid down in the said Pharmacopœia, unless the standard of strength, quality or purity of such drug be plainly stated on the bottle, box or other receptacle, or

(ii) if its strength, quality or purity falls below the professed standard under which it is sold or exposed for sale:

Provided that, when any drug is not sold or exposed for sale under or by a name recognized in any Pharmacopœia and the standard of strength, quality or purity of such drug is not stated on the bottle, box or other receptacle, the drug shall be deemed to be sold or exposed for sale under or by a name in the British Pharmacopœia or other recognized standard [section 3 (2) (*a*) of the Calcutta Municipal Act, 1923].

‡ All drugs, the package or label of which bears any statement, design or device regarding such drugs or the ingredients or substances contained therein as may be false or may mislead in any particular, shall be deemed to be 'misbranded'; and a drug shall also be deemed to be misbranded if it is offered for sale under the name of another drug [section 3 (42) of the Calcutta Municipal Act, 1923].

drugs. The sale, manufacture and storage for sale of ' adulterated ' or ' misbranded ' drugs or drugs which are unsound, unwholesome or unfit for human consumption are prohibited subject to exceptions in the case of the innocent addition of non-injurious ingredients, the unavoidable inter-mixture of extraneous substances in the process of collection, and the sale of articles in accordance with their patents. The sale or manufacture of any unwholesome drug or any drug notified by the Local Government or of any article with a similar name is also prohibited, unless the conditions prescribed in such notification are fulfilled. The Corporation has to provide for the inspection of drugs which are in course of transit or exposed for sale or in the process of manufacture. There are provisions for the inspection, seizure, analysis and destruction of drugs which appear to be adulterated, unsound, unwholesome or unfit for medicinal purposes and of utensils used for preparing or containing them which are of such a kind or state as to render the drug unsound, unwholesome or unfit for medicinal use. The Local Government may declare the normal constituents of any drug and determine by rules what deficiency in constituents or addition of extraneous matter will raise a presumption that the drug is not genuine or injurious to health. A Public Analyst is to have regard to such rules in certifying the result of his analysis. The duties of inspection, etc., devolve on the Health Officer or any person authorized by him in this behalf. The Corporation, in conjunction with the Local Government, are thus *prima facie* armed with considerable powers for dealings with drugs, but here again the absence of specified standards is reported to be the stumbling block. The definition of ' adulteration ' in section 3 (2) (*a*) provides for the specification of a pharmacopœia by notification in the Gazette. No attempt appears to have been made to specify a pharmacopœia on account of the obvious difficulties with which the problem bristles.

52. The Bengal Excise Act, 1909,* mainly deals with the licensing of, and levy of duty on, excisable articles and not with the maintenance of their purity. It, however, punishes the admixture of any noxious or objectionable substance with any excisable article (which does not amount to an offence under section 272, Indian Penal Code), as well as the infringement of any rule regulating the reduction of the strength of liquor. In actual practice, it is stated that the Excise Department exercises an indirect control upon the quality of the manufactured articles. Rai Sahib S. N.De of the Excise Laboratory of Bengal stated that " according to the rules laid down by the Excise Department, the licensees should prepare their products strictly adhering to the standard recipe laid down in the British Pharmacopœia in the case of B.P. preparations and to the approved recipe in the case of other preparations and infraction of

* Sections 49 and 86 (9).

these conditions may subject the licensee to forfeiture of his licence and to all or any of the other penalties prescribed by law or rules."

Madras

53. There is no Act in Madras which deals with the maintenance of purity of drugs or of their conformity to standards. The Madras Prevention of Adulteration Act, 1918, is concerned wholly with foods. The Madras City Municipal Act, 1919, and the Madras District Municipalities Act, 1920, contain provisions for inspection, seizure, etc., only in relation to foods. The Madras Abkari Act, 1886, punishes the mixture of any noxious drug or foreign ingredient with any intoxicating drug which is likely to enhance its actual or apparent intoxicating quality or strength.* That Act has no application if the adulteration would amount to an offence under section 272, I.P.C.

Bombay

54. The Bombay Prevention of Adulteration Act, 1925†, deals with foods only. The City of Bombay Municipal Act, 1888 ‡, and the Bombay District Municipal Act, 1901, deal with foods in the same manner as the Municipal Acts of Madras. But, unlike the Madras Acts, these provisions include articles of medicine also along with articles of food in their scope. The District Municipal Act punishes with fine the owner or person in possession of unwholesome or unfit food or medicine to which sections 273, Indian Penal Code, is not applicable, but the City Municipal Act levies fine for the possession of unwholesome or unfit food only. There is no provision for any satisfactory analysis. The City of Bombay Municipal Act, 1925, contains provisions similar to those of the Bombay District Municipal Act. The Bombay Abkari Act, 1878§, like the Madras Abkari Act, penalizes mixture which affects the strength or quality of the excisable article and does not deal with its mere adulteration.

The United Provinces

55. The United Provinces Prevention of Adulteration Act, 1912, seeks to prevent the adulteration of foods and drugs. The sale to the prejudice of the purchaser of any drug which is not of the nature, substance or quality demanded by him or the manufacture or sale of any drug which is not what it purports to be is penalized by the levy of fine which may extend to Rs. 100 for the first offence or to Rs. 500 for second or subsequent offences. The innocent addition of non-injurious ingredients, the unavoidable intermixture of extraneous substance in the process of preparation and the adulteration with non-injurious matter which is brought to the purchaser's notice by a label are all exempted from liability. Mere ignorance of the true nature of the article is not, however, recognized as a defence. Proprietary foods and medicines are excluded from the scope of the provisions restricting sale and manufacture of drugs.

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* Section 57. † Sections 413—417. ‡ Section 142. § Section 46.

56. The administration of the Act rests mainly on the 'Local Authority' as defined in the Act. The Local Government is empowered to appoint Public Analysts and official Inspectors, the latter to procure samples and the former to analyse them on submission to them. The Local Authority may also authorize persons to purchase samples for analysis and report by the Public Analysts. Purchasers of articles of food are also entitled to have samples analysed by the Public Analysts. The procedure for having articles analysed, is also specified. At the instance of either party, the court has discretion to send the article of food or drug concerned to the Chemical Examiner to the Government for analysis and report. The Act appears to have failed in its purpose on account of the inadequacy of the penalties for habitual offenders and of the absence of provisions prescribing the manner of the sale of drugs and pharmaceutical preparations and fixing standards for food and drugs. Most of the defects were cured by the United Provinces Prevention of Adulteration (Amendment) Act, 1930, although the fixation of authoritative standards for drugs was left unprovided for. It enables the Local Government to make rules for determining the constituents of foods and laying down standards. The penalty for manufacture or sale of adulterated foods or drugs was enhanced. Restrictions on mixing foods and drugs with injurious ingredients with intent to sell and on the actual sale thereof, identical with those contained in section 1 of the Food and Drugs (Adulteration) Act of England, 1928, were also inserted. The Local Government is empowered to require licences for the sale or manufacture of specified drugs.

57. The United Provinces Municipalities Act, 1916, contains provisions for the inspection of places used for the sale of drugs, for the inspection and examination of any drugs therein and for the seizure and destruction of adulterated, inert, unwholesome or noxious drugs, on the lines of the provisions contained in the Bengal Municipal Act, 1884. The United Provinces Excise Act, 1910,* punishes the admixture of any noxious or objectionable substance with any excisable article as well as the infringement of any rule regulating its strength or quality.

The Punjab

58. The Punjab Pure Food Act, 1929, deals only with food. The Punjab Municipal Act, 1911,† gives power to the Municipal committee to authorize any person to enter places used for the sale of drugs and inspect any such article which may be therein. He may remove any drug which he suspects to be adulterated in such a manner as to lessen its efficacy or change its operation or to render it noxious and cause the owner to be brought before a Magistrate for enquiry as to whether any offence has been committed in respect thereof and for orders regarding its disposal. The Punjab Excise Act, 1914, contains provisions similar

* Sections 68 and 41 (2). † Section 150.

to those contained in the United Provinces Excise Act, 1910, prohibiting the admixture of noxious or objectionable substances with any excisable article, and regulating its quality or strength.

Bihar and Orissa

59. The Bihar and Orissa Municipal Act, 1922, contains provisions empowering the Commissioners or any person authorized by them to enter and inspect drug shops and seize adulterated, inert, unwholesome or noxious drugs, similar to those in the Bengal Municipal Act, 1884. The Magistrate may also fine the owner or person in possession.

60. The Bihar and Orissa Prevention of Adulteration Act, 1919, makes the sale or manufacture of foods or drugs not genuine or below the prescribed standard or different from the food or drug demanded by the purchaser, an offence. It defines the expressions 'food,' 'drug' and 'not genuine' and provides for fixation of standards by rules made by the Local Government. It enables a person authorized by a Local Authority * to purchase samples compulsorily and submit them for analysis to the Public Analyst †. Any purchaser of a drug may also do so. It embodies the procedure for having samples analysed. In the course of any enquiry before the Court it may send the drug concerned to the Chemical Examiner for analysis at its own discretion or at the instance of the accused, unless it has been already analysed by the Chemical Examiner. The Act does not apply to the *bona fide* sale of a drug in an unopened tin or packet in the same condition in which it had been bought by the purchaser. The Bihar and Orissa Excise Act, 1915, contains provisions exactly similar to those of the Bengal Excise Act, 1909, as regards the admixture of any noxious or objectionable substance with any excisable article as well as the regulation of its strength.

The Central Provinces

61. The Central Provinces Municipalities Act, 1922, empowers a municipal committee to authorize the inspection and seizure, after examination, of any drug intended for human consumption which is unfit therefor. If the drug is adulterated in such a manner as to lessen its efficacy or change its operation or render it noxious, the owner or person in possession may be punished with fine which may extend to Rs. 100 and the article may be dealt with as the magistrate may think fit. Although there is provision for obtaining samples for analysis, the Act does not provide for the appointment of Public Analysts or of

* In respect of any area other than a municipality or a Cantonment, the Local Government may appoint any authority as Local Authority (section 12).

† In respect of any area the Local Government or the Local Authority with the approval of the Local Government may appoint any person as Public Analyst (section 12).

submission of samples to them. The Committee is empowered to make by-laws to regulate, by licence or otherwise, the manufacture or sale of articles of food and drugs. The Central Provinces Prevention of Adulteration Act, 1919, deals only with food. The Central Provinces Excise Act, 1915, appears to contain no provision regarding the admixture of any noxious substance, etc., with any excisable article, similar to the provisions contained in the Excise Acts of the other provinces.

BURMA

62. The Burma Municipal Act, 1898,* confers on the Municipal Committee power to make by-laws to regulate the sale of certain specified drugs, either by rendering licences necessary or otherwise, and to fix the hours and manner of transport within the municipality of the specified drugs and the places in which they may be sold or exposed for sale. †It also contains provisions for the inspection by any person authorized by the Committee of places for the sale or manufacture of drugs and for the seizure of adulterated articles similar to those in the Punjab Municipal Act.

63. The Burma Food and Drugs Act, 1928, deals with foods and drugs and extends to such areas and kinds of drugs as may be notified by the Local Government. The sale of any drug which is different in nature, substance or quality from that demanded by the purchaser and the manufacture or sale of drugs which are not what they purport to be, are made offences. Allowance is made for the exceptions recognized in the Acts of other Provinces. It also contains provisions for analysis of samples by Public Analysts on the lines of the other Acts. Public Analysts are appointed by the Local Government. The power to purchase compulsorily samples for analysis is given to the Medical Officer of Health of any local area, the Health Officer of any municipality or cantonment, or any officer specially appointed by the committees thereof or by the Local Government or any person authorized by the said officers. A dealer in or purchaser of the article is also entitled to get it analysed. The Local Government may make rules for prescribing the descriptive terms of labels and notices required by the Act. The Local Government has power to make rules relating to the procedure for analysis and determining the quantitative and qualitative standards of drugs and the limit within which the mixture or abstraction of ingredients may be made without injury to health.

64. The City of Rangoon Municipal Act, 1922,‡ (Burma Act VI of 1922), prohibits the sale, exposure for sale, or keeping for sale of any drug intended for human consumption or medical treatment and the manufacture of any such drug which is diseased,

* Section 142. † Sections 110, 111 and 111-A. ‡ Sections 132—144.

unsound, unwholesome or unfit for human consumption. The sale, manufacture and storage of any drug which has been adulterated, is prohibited under section 133. Adulteration is defined in the Act *. The sale or manufacture of any notified drug is also prohibited unless the conditions specified in the notification are complied with.

65. The Local Government may fix standards of quality, specific gravity and percentage of constituent parts in respect of any drug and may declare what deficiency in normal constituents or addition of extraneous substance will make it adulterated. In the case of such standardized drugs, the sale, manufacture and storage thereof should conform to the requirements of the notifications. The Act also prohibits the sale, manufacture and storage of substitutes for specified drugs. Ignorance is no defence, while *bona fide* purchase under a warranty is a good excuse. Authorized municipal officers may inspect places for sale or manufacture of drugs and the utensils used for preparing or containing them. They may seize the drug if unsound, unwholesome, unfit or adulterated or if it is a substitute, or if it does not comply with specified conditions and the utensil, if it is of such a kind or in such state as to render any drug prepared, manufactured or contained in it, unwholesome or unfit for medical treatment. Any authorized municipal officer may also seize articles in the course of importation into or transport within the city in contravention of the provisions of the Act. The seized articles may at once be destroyed with the consent of the owner or without it, if perishable, and those not so destroyed should be taken before a magistrate. The magistrate may order the destruction of the articles or their restoration to the owner with compensation, or confirm the seizure and order forfeiture to the Corporation. Condemned articles vest with the Corporation. The Act contains the procedure for getting samples of drugs analysed. A dealer in or purchaser of any drug may have it analysed by the Municipal Analyst. An authorized municipal officer may purchase samples compulsorily or seize them for purposes of analysis.

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* A drug shall be deemed to be adulterated—

(i) if, when it is sold or exposed for sale under or by a name recognized in the British Pharmacopœia, it differs from the standard of strength, quality of purity laid down in the said pharmacopœia, unless the standard of strength, quality or purity of such drugs is plainly stated on the bottle, box or other receptacle, or

(ii) if its strength, quality or purity falls below the professed standard under which it is sold or exposed for sale;

Provided that no adulteration shall be deemed to have taken place where—

(i) the drug was unavoidably mixed with any extraneous matter in the process of collection or preparation, or

(ii) any matter or ingredient not injurious to health has been added thereto or mixed therewith because such matter or ingredient was required for the production or preparation thereof as an article of commerce in a state fit for conveyance or consumption, and not fraudulently to increase the bulk, weight or measure thereof or to conceal its inferior quality, if the vendor in the prescribed manner brought to the notice of the purchaser the fact that such matter or ingredient had been so added or mixed. [Section 133 (2) of the City of Rangoon Municipal Act, 1922.]

66. In the Burma Excise Act, 1917, there are provisions prohibiting the admixture of any noxious or objectionable substance with any excisable article, etc., similar to those contained in the United Provinces and Punjab Excise Acts.

ASSAM

67. The Assam Municipal Act, 1923, contains provisions in respect of drugs which generally correspond to those in the Bengal Municipal Act, 1884. The Assam Municipal Act applies only to the municipalities of Assam and is of as little practical use as the Bengal Municipal Act.

68. The Eastern Bengal and Assam Excise Act, 1910, contains provisions against the admixture with any excisable article of noxious or objectionable substances similar to those contained in the United Provinces, the Punjab and Burma Excise Acts.

AJMER-MERWARA

69. The Ajmer-Merwara Municipalities Regulation, 1925, makes it an offence to sell, to the prejudice of any purchaser, any drug which is not of the nature, substance or quality demanded by the purchaser or any drug which is adulterated in such a manner as to lessen its efficacy or change its operation or render it noxious. The innocent addition of any non-injurious ingredient to an article for its preparation or production in a state fit for carriage or consumption and the unavoidable mixture of extraneous matter in the process of collection or preparation are excepted. The mere ignorance of the purchaser as to the true nature of the article is not a valid defence.

70. The Excise Regulation, 1915, which applies to the Provinces of Ajmer-Merwara, Coorg, and British Baluchistan, no doubt, controls the import, export, transport, manufacture and sale of intoxicating liquor and drugs, but it is designed to meet excise purposes and does not deal with adulteration.

OTHER COUNTRIES

71. Even in other countries, the importance of ensuring the absolute purity and the requisite standards of drugs in the market, was not prominently recognized until comparatively recent times. The laws in force at present in America and the Dominions, show a marked advance over those in England. The mechanism of control set up by the former is, in many respects, elaborate and the details thereof are full and comprehensive. The British Pharmacopœia, though the creature of a Statute, has not been openly recognized as laying down the proper standards and tests in England, while it is afforded recognition in other countries. Exports are altogether left untouched in England and the control of imports affected by orders in council is indirect and uncertain. Though the pressing need for drastic legislation in respect of

patent and proprietary medicines was felt so long ago as 1914, the Bill to control them failed to materialize, while Canada and certain other States have Statutes on the subject to their credit.

The United Kingdom

72. In the United Kingdom, the idea underlying the early statutes, the Adulteration of Coffee Act, 1718, the Adulteration of Tea and Coffee Act, 1724, the Adulteration of Tea Act, 1730, and the Adulteration of Tea Act, 1776, was not that of protecting the public from fraud and the danger to health likely to arise from bad food supplies, so much as to protect the revenue from loss; and, although concern for the well-being of the community did gradually creep into the statutes, it was not until the Bread Act, 1836, was passed, that the definite departure was made from the line of revenue protection to the line of protection of the health of the community. This ultimately found full expression in the Sale of Food and Drugs Act, 1875 (38 & 39 Vict. C. 63)*.

73. The Food and Drugs (Adulteration) Act, 1928 (18 & 19 Geo. 5 C. 54) is a consolidating Act which substantially replaced previous enactments on the subject commencing from 1875. It deals with the manufacture, importation, distribution and sale of foods and drugs generally and of certain special kinds of food, such as butter and margarine. We are mainly concerned with the provisions relating to drugs only. It penalized adulteration (with intent to sell) of drugs either by mixture with other ingredients or by abstraction of parts thereof, which affected the drug injuriously in quality or potency. The actual sale of drug so treated is also made an offence. The Act prohibits the sale of articles of drug, whether compounded or not, which are not of the nature, substance or quality demanded by the purchaser. This restriction does not apply to proprietary medicines or to patent drugs supplied according to the specification of patents in force. Addition of non-injurious ingredients for the production or preparation of a drug as an article of commerce in a state fit for carriage or consumption or in the process of collection, will be sufficient protection. Proper labelling is also efficacious in conferring exemption from liability.

74. The Act does not set up any standards of drugs. The British Pharmacopœia is not mentioned. Although the British Pharmacopœia has thus no Statutory or conclusive authority, the Courts will *prima facie* accept the standards therein as those to which samples of drugs sold under B.P. names should conform. The standards described in the British Pharmacopœia have thus for long received legal force through the provisions of the Food and Drugs Act, though evidence is admissible to show that the description in the Pharmacopœia is technically incorrect or that

* Halsbury's Statutes of England, Volume 8, page 841.

more than one kind or quality of article are known in commerce by the description given. The door is thus, no doubt, open for the establishment of alternative standards, however difficult the proof of such may be.

75. Under the Act, the ultimate control rests with the Ministry of Health or of Agriculture and Fisheries. The Local Authorities as defined in the Act * are in the first instance entrusted with the responsibility of enforcing the provisions of the Act. If they fail to do so and the failure affects the general interest of the consumer or of agriculture, the Minister concerned can empower an officer to carry out the provisions. The responsibility includes the duty of appointing Public Analysts and sampling officers, the latter to purchase samples and submit them for analysis to the former and to initiate prosecutions on their report. Purchasers of drugs are also entitled to have them analysed by the Public Analysts and to institute prosecutions on their own account. In certain cases, the court before which the proceedings are taken may refer the sample to the Government Chemist for fresh analysis and report. *Bona fide* purchase under a written warranty will be a protection if the articles had been sold as purchased and the warranty is pleaded within seven days after the service of the summons. The giving of false warranties and labels with false description is punishable under the Act. The Act provides for a graduated scale of penalties. The maximum is fine of £100 or imprisonment for three months. The civil liability of the vendor under the Common Law or the Law of Contract is expressly saved. There is no provision controlling importation or exportation of drugs in any manner. There is no central laboratory controlling the working of the Act.

76. The Therapeutic Substances Act, 1925, founded on a recommendation from the appropriate branch of the League of Nations, provides for the regulation of the manufacture, sale and importation of therapeutic substances, the purity or potency of which cannot be adequately tested by chemical means. It exercises a much closer type of control than the Food and Drugs Act. It applies to vaccines and sera included in the schedule and other therapeutic substances which may from time to time be added thereto as coming under the purview of the Act and requiring its application by regulations made under the Act. The Act controls the strength, purity and quality of the substances manufactured by requiring that the manufacturer as well as the

* (1) As respects the City of London, the Common Council;

(2) as respects any other part of the administrative county of London, the Metropolitan Borough Council;

(3) as respects a county borough, or a borough having a separate police establishment, or a borough which had according to the Census of 1881 a population of not less than ten thousand, and which had on the thirteenth day of August, eighteen hundred and eighty-eight, and for the time being has, a separate court of quarter sessions, the council of the borough;

(4) as respects any other area, the county council. [Section 13 of the Food and Drugs (Adulteration) Act, 1928.]

premises on which the manufacture is carried on should be licensed. This provision does not apply to the preparation of a substance by a medical practitioner for his own patients or for any individual patient of another at the latter's request. The Act also prohibits the import of such substances which do not comply with the prescribed standards. For the purpose of framing regulations and securing uniformity of standards, a Joint Committee consisting of the Minister of Health, the Secretary for Scotland and the Minister for Home Affairs for Northern Ireland is constituted with an Advisory Committee. The regulations prescribe the standard of strength, quality and purity of the substance, the units of standardization, the tests for determining whether the prescribed standards have been attained and the conditions of the licences. They may also prohibit sales otherwise than in specified containers and require labels with dates of manufacture and, if advertized or sold as a proprietary medicine or contained in such medicine, such accepted scientific name or descriptive name as is indicative of the true nature and origin of the substance should appear on the label.

77. The licensing authorities under the Act are the Minister of Health in England and Wales, the Scottish Board of Health in Scotland and the Minister of Home Affairs in Northern Ireland. An applicant for a licence must show that he has sufficiently good laboratories and a reasonably efficient staff for the manufacture of the substances concerned. He is required to keep a complete record of the manufacture of the different batches of each product and of the testing for potency and sterility of each batch. The Inspectors visit the different laboratories to see that the manufacture is being properly carried out. They buy samples of the different products which are for sale and make tests on their own account. There is a central laboratory which carries out the independent tests for the Inspectors. It is the National Institute for Medical Research. Although the manufacturers are not under any legal liability to send samples from every batch of a product which they make to a central institute, they do so in actual practice in the case of some particular substances, such as pituitary extract. The functions performed by this Central Institute are (1) to prepare and maintain the stable standards for the substances for which these have been defined in the regulations, (2) to issue these standards to the manufacturers and importers concerned, (3) to act as expert referees examining samples of the scheduled substances taken by the Inspectors of the Ministry of Health in England (the Scottish Board of Health makes its own arrangements for the testing of samples in Scotland), and (4) to test and issue certificates in respect of every batch in the case of certain products such as those of the Salvarsan group as a condition precedent to the putting of the batch on the market. The Act penalizes the sale, manufacture for sale and possession of any substance in contravention of it as well as the breach of the terms of the licence or regulations thereunder.

78. The Dangerous Drugs Act, 1920 (dealing with habit forming drugs), and the Poison and Pharmacy Acts have no direct bearing on the adulteration of foods and drugs.

THE UNITED STATES OF AMERICA

79. Until 1906 there was no federal law relating to foods and drugs. Most of the States have their own separate laws. Some of them, like New York, have laws regulating the sale of patent and proprietary medicines. The result is that the laws are both State and National in scope. In several States, the laws follow the general principles of the Federal Act, but in some there are material deviations. At present the control of foods and drugs is exercised by the Federal Food and Drugs Act of 1906, as amended in the years 1912, 1913 and 1927 and by the Meat Inspection Act, the Tea Inspection Act and numerous other Acts relating to specific products. The provisions relating to drugs may be briefly summarized. The Federal Food and Drugs Act is designed to prevent the manufacture, sale or transportation of adulterated or misbranded or poisonous or deleterious drugs and medicines, among others, and for regulating traffic therein. The provisions of the Act apply to adulterated or misbranded drugs which have been shipped or delivered for shipment in inter-State commerce, or which are exported or offered for export to foreign countries, or which are being transported in inter-State commerce for sale or have been transported in inter-State commerce, or which have been received from a foreign country, or which are manufactured, sold or offered for sale in the district of Columbia, territories of the United States or insular possessions.* Each State has complete control over inter-State commerce and drugs produced within its limits.

80. The manufacture of adulterated or misbranded drugs in any territory or district of Columbia, the shipment of any adulterated or misbranded drug, out of or into, or the delivery of any such article in original unbroken packages in, any State, territory or district of Columbia or its sale in or export from the district of Columbia or the territories of the United States, is made punishable by the Act. Adulterated or misbranded articles in the course of transmission may be seized for confiscation by a process of libel for condemnation and may be destroyed or sold or delivered to the owner on his executing a bond to the effect that they will not be disposed of contrary to the provisions of the Act.

81. The administration of the Act rests primarily with the Department of Agriculture, Food, Drug and Insecticide Administration. The Secretaries of the Treasury, Agriculture and Commerce are empowered to make rules and regulations for enforcing the provisions of the Act including the collection of samples for examination, the methods of analysis, the procedure at the hearings, the standards for drugs, etc. The analysis should be made by or under the supervision of the Food, Drug and Insecticide Administration Department and, in the event of any violation of the Act, the Secretary of Agriculture should certify the facts to the

* Regulation 2 of the Regulations, dated August 29, 1927.

proper United States Attorney who should cause appropriate proceedings to be commenced and prosecuted in the proper courts of the United States for the enforcement of the penalties provided in the Act. The maximum penalty is fine of 300 dollars or imprisonment for a term not exceeding one year or both. The regulations in force are those dated August 29, 1927. Proof that the articles were sold under a guarantee given in compliance with the regulations will exempt a dealer in foods or drugs from prosecution.

82. The Act recognizes the standards in the United States Pharmacopœia and the National Formulary as officially governing drugs. A Pharmacopœial or National Formulary drug is regarded as adulterated, if it differs from the accepted standard of strength, quality or purity and any other drug, if it falls below the professed standard of quality; but, in the former case, it will not be treated as adulterated if the actual standard of strength, quality or purity be plainly stated on the container. Drugs recognized in the United States Pharmacopœia or National Formulary should be analysed by the tests laid down therein and other drugs should be analysed by methods prescribed by the Association of Official Agricultural Chemists or by methods satisfactory to the Food, Drug and Insecticide Administration. 'Misbranding' takes place if the label of a drug contains a statement, design or device regarding the drug or its ingredients or of their curative or therapeutic effect which is false or misleading. Imitation of, or sale under the name of, another article or the substitution of the contents of a package with other material or the failure to bear on the label a statement of the quantity or proportion of specified ingredients such as alcohol, etc., would also amount to misbranding.

83. No special supervising control is exercised over patent or proprietary medicines except as regards misbranding. It is expressly mentioned in the regulations that statement of the formula is not required on the label except in so far as it may be necessary to secure freedom from adulteration or misbranding.

84. The Act embodies special procedure for dealing with imports. The enforcement of the provisions relating to imported drugs is under the local direction of the officers of the stations of Food, Drug and Insecticide Administration of the Agricultural Department. Collectors of Customs act as administrative officers in carrying out directions relative to the detention, exportation and destruction of merchandise and action under bond in case of non-compliance with the provisions of the Act. Merchandise will not be delivered to the consignee prior to report on examination unless a bond for the value of the goods is given. If violation of the Act is disclosed a formal enquiry will be held after notice to the importer. If goods are to be refused entry, the chief of the station will notify the Collector of it, who will call on the importer to export or destroy them in three months. The goods may be released in certain cases after relabelling or compliance with stipulated conditions. The inspection officer has to certify to the performance of the conditions. If the goods are not "conditioned" within the period allowed, they will be exported or destroyed.

The Collector will report the final action taken to the Chief of the Station.

85. An article of drug intended for export is not adulterated or misbranded within the meaning of the Act if it is established by the shipper or exporter that the article is prepared or packed according to the specifications or directions of the foreign purchaser and that no substance is used in the preparation or packing thereof in conflict with the laws of the foreign country to which the article is intended to be shipped. Such an article should be labelled so as to show that it is intended for export and is prepared or packed in accordance with the specifications or directions of the foreign purchaser. If it is, however, sold or offered for sale for domestic consumption, it will be subject to the provisions of the Act regarding domestic sale. The Regulations permit the import of adulerated foods or drugs for technical or restricted use under certain conditions.

CANADA

86. The Act in force in Canada is the Food and Drugs Act, 1920. It defines 'adulteration' and 'misbranding' of foods and drugs on the lines of similar Acts in other Colonies. Every drug is to be deemed to be adulterated if its strength, quality or purity falls below the professed standard under which it is sold or if, when exposed or offered for sale under a name recognized in the latest edition of the British Pharmacopœia or of any foreign pharmacopœia or in some generally recognized standard work on *materia medica* or drugs, it differs from the standard of strength, quality or purity laid down therein. The British Pharmacopœia and the standards therein are specially recognized as, in the absence of any indication to the contrary, they will govern every drug. The Governor in Council may make regulations prescribing standards of quality and potency, defining official methods for biological testing in any laboratory, providing for licensing of manufacturers of drugs, inspection of premises, equipment and technical qualifications of the staff of manufacturers and requiring that portions of each batch of drugs should be tested in the laboratories of the Health Department, or that only approved batches should be imported or sold. Any person who by himself or his agent manufactures for sale, or sells any adulterated or misbranded article of food or drug, is guilty of an offence under the Act. Labelling as to 'purity' is prohibited; so also are misleading statements. The Act regulates the distribution of samples.

87. The Council of any city, town or other municipality may appoint inspectors. The Governor in Council makes regulations prescribing the duties of Inspectors and for designating as Dominion Analyst any member of the technical staff already appointed to the services of the Department of Health. The Inspectors are empowered to inspect and procure samples from manufacturers or vendors or from consignments sought to be imported into Canada and submit them to the Government Department which administers the Act for analysis by the Dominion Analyst. Any person may

also submit samples to the Analyst for analysis. They may initiate prosecution in the case of adulteration or misbranding. The Analyst should give a certificate as to the adulteration and its injurious character and it is open to the aggrieved party to contest it before the Chief Dominion Analyst who may again cause it to be analysed. The certificate of the Chief Dominion Analyst is final and conclusive. Proof that the article was *bona fide* purchased in the same state as that in which it was sold and that the vendor could not know of the adulteration or misbranding with reasonable diligence is a good defence. Either he or the prosecutor may in such a case lay information against the third party from whom the purchase was first made and the court can decide on the entire merits of the case.

88. Articles of drug which are reported as adulterated or misbranded by the Dominion Analyst may be seized and the Minister may declare them to be forfeited to the Crown. Materials used for purposes of adulteration may also be seized, analysed and treated similarly.

89. Canada has a Patent and Proprietary Medicine Act.* It applies solely to remedies or prescriptions manufactured for the internal or external use of man which do not bear on the labels and wrappers the full formula or true list of medicinal ingredients and proportion of each scheduled drug contained therein, or are not manufactured in accordance with the name, composition and definition of a medicine referred to in the British Pharmacopœia, the Codex Medicamentarius of France, the Pharmacopœia of the United States, or any foreign Pharmacopœia approved by the Minister, the Canadian Formulary, the National Formulary of the United States of America, or any formulary adopted by any properly constituted pharmaceutical association representing the Dominion of Canada and approved by the Minister; hence, preparations designed solely for toilet or veterinary purposes are exempt from the provisions of this Act. A numbered certificate of registration should be procured for each medicine before it is imported into or offered for sale in Canada. The number should be printed on the wrapper and label. The registration need be made only once unless the name or composition or other characteristic of the medicine is changed; the manufacturer has, however, to take out a licence to sell, every year. The registration certificate is for identification only and has no reference to the merits of the medicine. Any improper use of it in any advertisement is punishable and no medicine should be sold or imported which bears representations respecting certificates issued under any Canadian or foreign governments different from that allowed under the Act. At the time of applying for registration, the manufacturer must name each medicinal ingredient used in his medicine and the purpose for which the medicine is designed.

90. If any of the scheduled drugs are contained in the medicine, the manufacturer should also furnish the Minister with a

* The Patent and Proprietary Medicine Act, as amended on 7th of July 1919.

sworn statement of the quantity of such drug or drugs contained in it. The preparation of any medicine containing any such drug should be continuously supervised by a pharmacist or a chemist if so required by the Minister.

91. Proprietary or Patent medicines containing (1) opium or its derivatives for internal use, or (2) cocaine or any of its salts or preparations or (3) alcohol in excess of the amount required as a solvent or preservative or which is not sufficiently medicated to make it unfit for use as a beverage or (4) any of the scheduled drugs in excess of the quantity permitted by the Advisory Board should not be manufactured, imported or exposed for sale. If it contains any of the scheduled drugs, the names thereof and the amount per dose, should be printed on an inseparable part of the label and the wrapper. Patent or proprietary medicines represented as a cure for any disease or about which false, misleading or exaggerated claims are made on the wrapper or label, or in any advertisement, are not permitted in Canada. Medicine intended for infants under one year of age should not contain any derivative of coal tar which, in the opinion of the Advisory Board, is dangerous to such children. Drugs should be designated by their commonly used names. All proprietary or patent medicines should be put up in packages or bottles and the name and number as well as the manufacturer's name and address should be put on the label or wrapper. In order to enable a manufacturer who is not a resident of Canada to sell his medicine there, he should file with the department the name of any person or corporation in Canada as his agent.

92. The Minister may order any officer to obtain samples and the manner of obtaining and treating them should be provided for in regulations made by the Minister. Sample-distribution is prohibited except in the case of manufacturers or wholesale dealers distributing samples to the trade. Unlicensed medicines may be seized and ordered to be forfeited or destroyed. Proof of sale in the same state as and when it was purchased and the fact that with reasonable diligence the vendor could not have obtained knowledge of the improper character of the medicine is a good defence. If steps are taken to bring the third party, from whom the purchase was made, before the court, it may decide on the entire merits of the case.

93. The Minister has power to appoint an Advisory Board of which the Chief Dominion Analyst or his assistant shall be a member. The Advisory Board has power to prescribe what shall be a sufficient medication of medicines, containing alcohol in excess of $2\frac{1}{2}$ per cent, to make them unfit for use as beverages and what shall be the maximum single and daily doses in the case of medicines containing any of the scheduled drugs. The decision of the Advisory Board in all such cases will be final. The Governor in Council has power to make regulations to give effect to the provisions of the Act and to add to or remove from the schedule, any drug.

94. This Act goes further than the regulations in force in New York under which the applicant for a certificate of registration of a patent or proprietary medicine is not required to disclose the names of the ingredients thereof (other than the specified ones) unless called on to do so by the Commissioner of Health.

Australia

95. Under section 51 of the Commonwealth Constitution Act, 1900, Commonwealth Parliament has power to make laws with respect to trade and commerce with other countries and among the States. The Commerce Trade Descriptions Act, 1905, was accordingly passed by the Federal Parliament. It prohibits the importation of articles used for food or drink or medicine as well as the export of certain specified articles without a ' trade description ' in accordance with the Act. Each State also deals with the inspection and sale of food and drugs either under Health Acts or Pure Food Acts of its own.

96. The Pure Food Act, 1908, of New South Wales was passed for securing the wholesomeness and purity of foods and drugs and fixing standards for them and for preventing deception and the sale or other disposition or use of articles injurious to health. It defines ' adulteration ' and ' false description ' of an article of food or drug and prohibits the sale of adulterated or falsely described food or drug. Mixing of food or drug so as to be injurious to health or as to increase bulk is made punishable by the Act. It is also an offence to sell food or drug so mixed or which is not of the nature, substance or quality demanded by the purchaser. Drugs should comply with the description and tests prescribed in the British Pharmacopœia unless expressly excepted by a notification in the Gazette under the authority of the Minister. The sale of a food or drug which is a mixture is allowed if the ingredients are pure and undeteriorated and it is labelled as a mixture with the names of the ingredients. But such labelling is unnecessary if the article is non-injurious and is not recognized by the British Pharmacopœia or if it is supplied under the orders of a qualified medical practitioner. In the case of sale of a food or drug in a closed package to an officer, in contravention of the provisions of the Act, the person whose name appears on the label as the importer, manufacturer or the packer, will be held to be guilty of an offence against the Act.

97. The administration and enforcement of the Act is primarily the duty of the Board of Health, but by the direction of the Governor it may be left in any case to the Local Authority as defined in the Act. An officer having authority under the Act may enter any place and inspect articles of food or drugs kept for sale, storage, delivery, conveyance, or manufacture. He may remove samples for analysis or seize any article which appears to be injurious to health or unwholesome or unfit for use and any vessel containing it. Any magistrate of justice may, after hearing the owner, confirm the seizure and order forfeiture and destruction

of the article or restore it to him. Any officer has also power to purchase samples on his own motion or at the request of any person on payment of the price thereof. They may forward portions of it for analysis to an Analyst in accordance with the procedure laid down in the Act. The Board may require any Council to submit for analysis during each year not less than three samples, for each thousand persons of its population, of any article of food or drug specified by it on the recommendation of the Advisory Committee as constituted by the Act. Analysts are appointed by the Governor who may make regulations as regards their qualifications. A Council may also appoint Analysts with the approval of the Governor. The prescribed methods of analysis and apparatus should be used.

98. The penalty on conviction for an offence under the Act is ordinarily fine; but, if the adulteration is injurious to health or if the offence is wilful or due to culpable negligence, imprisonment up to six months may also be awarded. Articles of food or drug to which a conviction relates, may be ordered to be forfeited and they may then be disposed of as the Board directs. The Board, on the recommendation of the Advisory Committee, makes regulations prescribing standards for the composition, strength, purity or quality of any food or drug or for the nature or proportion of the substance which may be mixed with it; prohibiting certain modes of manufacture or use of certain appliances therein; and prescribing methods of analysis and requirements of labels, etc. The President of the Board has power to call on any person to produce any books of the nature of store records, or which deal with reception, possession, or delivery of any food or drug, if he suspects that he is in possession for sale or manufacture, of any article of food or drug in contravention of the Act. Proof of *bona fide* purchase of food or drug under a guarantee in compliance with the conditions mentioned in the Act and sale in the same state as at the time of purchase, is a good defence to a prosecution for adulteration or false description. On the recommendation of the Advisory Committee, the Board may cause any food or drug or appliance, which is advertised, to be examined and the Governor, on the recommendation of the Board or of a District Judge on appeal, may prohibit the advertising or sale of any food or drug or appliance which is injurious to life or health or which by reason of its inactivity or inefficiency is useless for the advertised purposes of cure. The Act does not require proprietors or manufacturers of proprietary foods or drugs which contain no unwholesome added ingredient to disclose the trade formulæ except in so far as it may be required by the Act to secure freedom from adulteration or false description.

99. The Health Acts 1900 to 1922, Part VI. in force in Queensland, contain provisions similar to those relating to Food and Drugs in the Pure Food Act, 1908, of New South Wales.

The Commissioner of Public Health appointed by the Governor in Council is, under the Minister, charged with the administration of the Act. The Local Authorities should see to the execution of the regulations or orders of the Commissioner. Analysts, Inspectors and other officers are appointed by the Governor in Council.

The Union of South Africa

100. The laws in force in the Union until recently were old and inadequate and were based on the English Act of 1875. The need for an up-to-date and uniform law for the whole union was long recognized and led to the passing of the Food, Drugs and Disinfectants Act of 1929. It consolidated and amended the laws for regulating the labelling and for preventing the importation or sale of foods and drugs which are unwholesome or adulterated or incorrectly or falsely described. The administration and enforcement of the Act vests in the Minister of Public Health and the Health Department; but Local Authorities are required to co-operate generally and the Minister may, on the request of a Local Authority, delegate to it the carrying out and enforcement of the Act and regulations within its area in respect of specified articles. Adulteration and false description are fully defined and include the addition of any foreign substance or abstraction of any ingredient which affects its properties, the non-compliance with standards and misleading descriptions. The innocent removal of any substance or the addition of ingredients, which are not unwholesome, for preparation of the article as an article of commerce in a fit state for carriage, consumption or use and the unavoidable mixture of extraneous matter in the process of collection or preparation, are permitted. In the case of drugs, the standards and methods of analysis are those in the British Pharmacopœia or any official addendum as may be notified in the Gazette and for those not mentioned therein, they will be prescribed by regulations and, in default of such prescription of standards, commercial standards will prevail. The standards for food are those prescribed in the Act or by the regulations or by any other law governing the same. The sale of adulterated or falsely described food and drugs or those which are not of the nature, substance, quality or standard demanded by the purchaser and injurious abstractions, admixtures and processes without disclosure thereof are prohibited. Such disclosure is not necessary in the case of a mixture of drugs dispensed by a medical practitioner or a chemist and druggist or a proprietary or patent article sold in the condition required in the specification of the patent. Preservatives and colouring matters should not be added to food unless permitted by the regulations. The importer, manufacturer or packer of an article sold in a sealed original package is responsible, if it contravenes the Act; but proof of deterioration, after it left his possession, will exonerate him, although it may not relieve the seller.

101. Analysts, pathologists and inspectors required for the enforcement of the Act are appointed by the Minister. The Inspectors are empowered to purchase or seize samples of suspected articles and submit them for analysis to the Analysts and Pathologists. The Secretary for Public Health may also authorize in writing an Inspector to enter premises and inspect and seize articles or records connected with them for ascertaining whether they are unwholesome or adulterated or falsely described or whether any unauthorized process is adopted in their preparation. If after analysis and further enquiry by the magistrate the articles are found to contravene the Act they may be ordered to be forfeited or destroyed or otherwise dealt with as the court may direct in addition to the enforcement of the criminal liability incurred by the offender.

102. In the case of imported articles, the powers of an Inspector may be exercised by an authorized officer of the Department of Customs and Excise and there are special provisions for the detention of consignments by the Commissioner of Customs acting with the concurrence of the Secretary for Public Health and for their sampling and analysis. If the articles are found to contravene the provisions of the Act, the Secretary for Public Health may order forfeiture or destruction or return to the port of entry or shipment or allow conditional import or otherwise deal with them as directed by the Minister.

103. Legal proceedings under the Act should be instituted within 60 days and, in the case of perishables, within 21 days of the date of sampling. A Local Authority duly authorized thereto by the Minister may institute such proceedings. Purchase under a warranty complying with the conditions set out in the Act is a good defence. Ignorance or absence of intention is not a valid answer although proof of care may be taken into account in assessing the penalty. The Court may, of its own motion or at the request of either party, call for additional analysis by an analyst or pathologist nominated by the court who may be a stranger if none appointed under the Act is available. The Act confers wide powers on the Minister to make regulations prescribing the nature and composition of articles of food and drugs and standards of strength, potency, purity and quality or other property of any food or drug, the methods for manufacture and for analysis and the mode of labelling, etc.

New Zealand

104. The Sale of Food and Drugs Act, 1908, was passed in consolidation of the previous Act of 1907 with a view to make better provision for the sale of food and drugs. Adulteration of an article is defined as (1) the addition or omission of any substance which diminishes its nutritive or beneficial properties or otherwise operates to the prejudice of the purchaser, (2) the mixture of any substance of lower commercial value and (3) the non-compliance with prescribed standards. The sale of food or drug which is adulterated (without giving notice of the adulteration) or misbranded or which

contains substances contrary to the regulations is an offence. Exceptions may be prescribed by the Governor in Council. Purchase of the article under a warranty *bona fide* is a good defence, while the fact that the offence was not wilfully or intentionally committed is no answer without proof of reasonable care. On conviction, in addition to the punishment of the offender by levy of fine, the articles of food or drug and the vessel, etc., containing them will be forfeited.

105. The Act is administered by the Health Department. Analysts are appointed by the Governor. Any Officer as defined in the Act * may inspect any place where there is any food or drug for sale and seize it if it appears to be unwholesome or deleterious to health. It may be destroyed if it is decayed or putrefied. On complaint by any person, the magistrate may release it or confirm the seizure. There are provisions for compulsory purchase of samples by any officer for purposes of analysis of his own accord or at the instance of any person on payment of the prescribed fee. The Act embodies the procedure for submitting samples to the Analyst. The methods of analysis may be prescribed by regulations. The magistrate may order independent analysis by another analyst. The Chief Health Officer may require information relating to food or drug to be made available to him if he suspects that any person is in possession of it for sale or manufacture for sale in breach of the Act. When food in connexion with which an offence is committed is sold in an unopened package, the importer or manufacturer whose name appears on it shall be deemed to have imported or manufactured it.

106. Considerable progress has been made in following out the purposes of the Act, all the commonly used foodstuffs being standardized and the labelling of packages being controlled by regulations, which are revised and added to as the necessity arises. However, experience showed that the reputation obtained by an article as the result of advertising neutralised the attempts made to properly guide purchasers by ensuring purity in quality and truthfulness in labelling. This was met by an amendment of the Act in 1924 which controls publicity calculated to deceive a purchaser in regard to the virtues of an article of food or drug.

Chapter II

Pharmacy

All-India and Provincial

107. The Indian legislature has not passed any Act dealing with pharmacy. The Indian Poisons Act, the Indian Opium Act and the Dangerous Drugs Act, no doubt, control the

* 'Officer' means an officer of the Department of Public Health or any person appointed an officer for the purposes of the Act by the Governor (section 2).

manufacture, sale, possession and import of certain drugs, but they have no relation to pharmacy *as such*. The objects, which mainly underlie them, are the collection of duty and the prevention of illicit traffic in connexion with such drugs. They do not ensure that persons selling or keeping open shop for the retailing, dispensing or compounding of poisons and narcotics should possess a competent practical knowledge of their business. The licences issued in certain cases make mention of ' chemists ' and ' compounders ', but no statutory enactment controls their qualifications. The Acts are administered by the Excise Department and so long as the official concerned is satisfied that any person can be trusted to conform to the regulations and conditions of the licences, he is granted a licence and the necessity for the employment of a person qualified to handle and sell those drugs does not receive any manner of consideration.

108. The dearth of legislation is equally striking in the Provinces. In some, there are Municipal Acts which contain provisions requiring the registration of shops for the sale of drugs and prohibiting the exercise of the profession by unqualified compounders. There are such Acts applicable to the municipalities of Bengal (Calcutta and the mufassal), Bihar and Orissa and Assam.

109. Under the Bengal Municipal Act, 1884, shops or places for the retail sale of drugs recognized by the British Pharmacopœia, which are not articles of ordinary domestic consumption, have to be registered in the office of the Commissioners and a licence obtained from them. Only persons certified by the Local Government under rules made for that purpose could compound, mix, prepare, dispense or sell drugs in any such shop or place. The sale of drugs used by practitioners of indigenous medicines, whether recognized by the British Pharmacopœia or not, is exempted from these restrictions when such drugs are sold elsewhere than in a shop or place dispensing medicines of the British Pharmacopœia on prescription. The Municipal Acts of Bihar and Orissa and Assam contain similar provisions except that in the former the rule-making power for the qualifications of compounders, etc., vests with the Commissioners and in the latter, the sale of patent medicines is exempted from any restriction.

110. The Calcutta Municipal Act, 1923, is also on the same lines, but more stringent in one respect, as it extends the restriction requiring the registration and licensing of places for sale of drugs to those used by the practitioners of the indigenous systems of medicine also, although the requirement that the vendor, compounder, etc., should be a properly qualified man is not made applicable to such a case. This Act amplifies the rule-making power in detail.

111. It empowers the Local Government to make rules prescribing an educational course for candidates for compounders' certificates and the fees for the course regulating the examination

of candidates, the grant of certificates and the registration of certificates so granted, permitting persons having the requisite qualification but not obtaining the certificate to compound, mix, prepare, dispense or sell drugs. The rules may authorize the cancellation of any certificate so granted or the withdrawal of permission given to any person who is proved in the course of a judicial trial to have made a serious mistake through ignorance or carelessness in the compounding, mixing, preparing, dispensing or selling of drugs.

112. Pursuant to statutory powers or, in their absence, in their administrative capacity, the Local Governments of these and other Provinces have made rules regulating the education, training and grant of certificates to compounders. These rules provide for the training of those who are commonly called 'compounders' and not of the superior class of pharmaceutical chemists who have scientific knowledge of the properties of the ingredients and of analytical tests. In Madras, however, a special course of training is given for such persons also in the Medical College. But, want of public support and encouragement by Government has, in the opinion of the Pharmaceutical Society of India, resulted in the dearth of candidates for that course. Doctor Lakshmanaswami Mudaliar of Madras also speaks in the same strain:—

> At present, in this Presidency, there are a class of persons called chemists and druggists who are trained at the Madras Medical College and who attain a high standard of proficiency in pharmacy. Although this class has been in existence for a large number of years, it has not attracted many candidates for the obvious reason that the openings have been few and that those who have passed out have not met with any encouragement either from the Government or from private concerns. There is another class of persons called compounders, who are trained by the Local Government, and this class receives only an elementary instruction in pharmacy and it cannot be said that they come up to the standard required.

Other Countries

113. In many of the other countries, the profession of pharmacy is restricted and the requirements for admission to practice are rigorous and stringent. With a view to ensure a high standard of efficiency, the pharmacist is made to undergo a long period of training and is specially educated and qualified by examination to prepare and dispense medicines.

Great Britain

114. The profession is controlled by the Pharmaceutical Society of Great Britain. The society was first founded in 1841 and it received a Royal Charter of incorporation in 1843. Chief among its chartered objects are 'the advancement of chemistry and pharmacy and the promotion of a uniform system of education for persons practising the same.' The registration and general control of Pharmaceutical chemists and chemists and druggists was entrusted to the society by the Pharmacy Act, 1852, which has been amended and extended in its operation by the

subsequent Acts of 1868, 1869, 1898 and 1929. The Acts provided for the registration of duly qualified pharmacists. It was made an offence to use the titles of pharmaceutical chemists, pharmacists and chemists and druggists without being duly qualified or registered. Registered pharmacists alone have the right to sell the scheduled poisons by retail. The business of a corporate body or of a deceased chemist could be carried on if it is in charge of a duly registered chemist. The society conducts the qualifying examinations for registration under the Acts and for membership on its rolls. Members of the medical profession are not entitled to be registered as chemists. The Act does not extend to the business of a qualified apothecary or a member of the Royal College of Veterinary Surgeons or a wholesale dealer in poison or apply to the preparation or sale of patent medicines strictly so called, which are the subject of letters patent, nor does it restrict the dispensing of prescriptions, not containing poisons, by unqualified proprietors of drug stores. The dispensing of poisons otherwise than in a shop, as in a hospital, is not also affected by the Acts.

America

115. There are pharmacy laws in almost all the States of America. In New York, for example, the two classes of the profession are recognized as distinct and separate—the pharmacists and the druggists—and none else are ordinarily permitted to deal in drugs and medicines. A licensed pharmacist can dispense, compound or sell drugs, chemicals, medicines, prescriptions or poisons in a registered pharmacy anywhere in the State. A licensed druggist can also do so in a registered drug store, but only in a place of not more than one thousand inhabitants. He may be employed for dispensing, etc., in a registered pharmacy and also perform such duties during the temporary absence of the pharmacist, except in cities of more than one million inhabitants. Each pharmacist or druggist cannot have personal supervision of more than one pharmacy or drug store at the same time. There are special provisions for corporations and executors to carry on the business of pharmacies and drug stores. Physicians and store-keepers are allowed to compound medicines under certain conditions in small villages which are more than three miles away from a pharmacy or a drug store.

Canada

116. In the provinces of Canada, there are similar laws. In Alberta, no person shall sell or keep open a shop for retailing, dispensing or compounding any of the specified poisons or drugs or assume the title of chemist and druggist or pharmacist unless he is registered. Every place in which drugs or medicines are compounded for sale, either by retail or wholesale, should be under the immediate personal supervision and management of a pharmaceutical chemist. The Act does not affect the privileges of legally

qualified medical practitioners. Medical practitioners are entitled to be registered as pharmacists upon passing the prescribed examination in the subjects of pharmacy and materia medica.

New Zealand

117. The Pharmacy Act, 1908, consolidates the enactments relating to pharmacy in New Zealand. It creates a pharmaceutical society consisting of all those who are registered under the Act as phamaceutical chemists. The society is governed by the Pharmacy Board set up by the Act. The chief functions of the Board are (1) to cause the names of duly qualified persons to be registered, (2) to prescribe subjects for the qualifying examination of pharmaceutical chemists with the approval of the Governor in Council, and (3) to control and conduct such examinations and grant or refuse certificates of competency. The holder of a certificate or diploma of competency as pharmaceutical chemist or homœopathic chemist from the Pharmaceutical Society of Great Britain or of Ireland or from any College, Board of Pharmacy or Pharmaceutical Society recognized by the Board, or a legally qualified medical practitioner, or any one who has passed the examination and the apprenticeship prescribed by the Board is entitled to be registered as a pharmaceutical chemist. The examination will be in the subjects of materia medica, botany, chemistry, practical chemistry, pharmacy and practical pharmacy and such other subjects as may be prescribed. The period of apprenticeship is three years and should be under a registered chemist or chemist and druggist or homœopathic chemist keeping open shops for the compounding and dispensing of prescriptions.

118. No chemist's shop can be opened in the Dominion except under the charge and supervision of a registered chemist as proprietor or manager. Registered chemists alone are permitted to use the title of pharmacist, pharmaceutical chemist, pharmaceutist, chemist and druggist, dispensing chemist or homœopathic chemist. The Act does not apply to any wholesale dealer who supplies drugs and chemicals in the ordinary course of wholesale dealing or to the business of the sale of herbal or botanical medicines. It does not also apply to such patent or proprietary or homœopathic or other medicines or chemicals as are usually sold by grocers or store-keepers.

SECTION III.—THE ENQUIRY

CHAPTER I

Drugs of the British Pharmacopœia

119. We propose to examine in this chapter the extent to which drugs and chemicals of the British Pharmacopœia which are of impure quality or of defective strength are imported, manufactured or sold in India. This is the central problem in the enquiry. Little is known about it with any degree of precision. No systematic attempt has been made in the past to collect authentic information on the subject with the result that no literature or data throwing light on it with any degree of definiteness, upon which the Committee could proceed as a basis, was available. The scantiness of reliable and accurate knowledge or materials served to shroud the problem with a mist of uncertainty and conjecture which was only deepened by its highly technical character and the vagueness of the allegations made by the protagonists on either side. The difficulty in arriving at a satisfactory solution is also enhanced by the fact that an exact estimate of the purity or strength of a drug with any pretence to accuracy can be formed only after subjecting it to analysis—a process which may involve considerable labour and expense. The absence of experts and facilities for carrying out such tests and analysis rendered evidence of that description extremely meagre. The situation is further complicated by the fact that certain drugs will defy even chemical analysis so that, in their case, detection by such means is well nigh impossible. Messrs. Smith Stanistreet & Co., Limited, observed, in this connexion: "A good proportion of the imported drugs that are adulterated or are of weak strength are such that could not be, by any chemical test, proved to be other than what they should be. We refer to such things as Extract of Gentian, Liquid and Solid Extracts of Liquorice, Taraxacum, Damiana, Cascara and many others; mixed powders, like Compound Liquorice Powder, provided there is a good proportion of the genuine article present, and such things as extractive, spirit strength, solubility, and so forth had been arranged. It would be very difficult to give any proof that would satisfy a court of law that such a preparation was not what it should be; but any trained pharmacist would have no doubt whatever about its quality, and would promptly reject it."

120. In the endeavour to ascertain the existing state of affairs and to gauge the extent of inferiority of the drugs served to the public with a reasonable degree of exactitude, the Committee availed itself freely of the evidence of Medical Experts, Pharmacists, Health Officers, Officers of the Customs department, Chemical Examiners and Analysts whose knowledge and experience entitle

them to speak with weight and authority. Although the evidence cannot be described as uniform in all respects, the cumulative effect is decidedly unequivocal.

121. The written replies to the questionnaires received from Assam, the North-West Frontier Province, and the majority of the Indian States of Western India disclosed no complaint and testified to a sense of satisfaction with the quality and the strength of the drugs supplied in those provinces, while those from the Punjab and the Central Provinces delineated a totally different picture and contained an emphatic condemnation of the drugs in use in those provinces. Opinion is divided in Madras, Bombay, Burma, Bengal and the United Provinces—that in the first three preponderating in support of the existing conditions, while the opposite view is dominant in the other two provinces. Classifying the views from a slightly different standpoint, we find that criticism emanates mostly from non-officials, as officials apparently obtain their drugs from the Government Medical Stores or from dealers of repute and standing.

122. If the written replies create any doubt or vacillation, it is effectively dispelled by the oral evidence which is decisive in tone and character. The unanimity of opinion among the witnesses, official and non-official, examined by the Committee is remarkable. All of them, with the exception of a few, denounced the present condition in no uncertain terms and called for stringent control over the manufacture, sale and importation of drugs. Only a single dissentient voice was heard in each of the provinces of Madras, Bengal and North-West Frontier, while there were two in the United Provinces. The force of this volume of oral evidence cannot be exaggerated. Further, oral evidence which is subjected to some measure of cross-examination is by its nature entitled to greater weight than written replies to questionnaires.

123. The Committee is aware that the experience of a majority of the witnesses is based on clinical results and is fully alive to the infirmities to which such results are subject. Mere failure in action on a patient cannot be regarded as a safe guide in pronouncing on the quality or strength of a drug. The results are liable to be affected by several factors—overdoses, short dosage, erroneous mixtures with other ingredients and the peculiar conditions and susceptibilities of the patients—all of which play no mean part and have to be reckoned with. Even after making the utmost allowance for all these considerations, the Committee cannot find its way to brush aside the effect of the weight of the testimony in support of the deplorably unsatisfactory condition of the strength and purity of the drugs in use in India. The training and opportunities of observation which the witnesses have invest their evidence with special value.

124. The conclusion based on clinical experience gathers strength from a consideration of certain circumstances spoken to by some of the witnesses. The therapeutic effects of some well-known drugs of proper quality and strength are so pronounced and characteristic that their absence cannot but give rise to legitimate suspicion. The variation of clinical results of drugs obtained from different firms cannot but be ascribed to differences in strength or quality of the drugs. Doctor Lakshmanaswami Mudaliar has noted that "there are certain drugs sold in the market at rates which are so widely different that it is but reasonable to infer that the cheaper drugs are probably of doubtful quality." The issue of two qualities of the same medicine, such as oil of eucalyptus, both marked B.P. at different prices, mentioned by Major Clyde of Meerut, and of syrup of orange of two grades, one of B.P. and the other not so marked, referred to by Colonel Higham of Bombay, are classical instances which speak for themselves. The former went so far as to say that with drugs such as quinine, cinchona febrifuge, digitalis, nuxvomica, magnesium sulphate, cascara and ipecacuanha wine, one never knows the action from any given dose. There is evidence that some firms export goods which are described as specially manufactured for India and these are said to be defective in quality and strength. The Sindh Medical Union observed:

> We have no means to ascertain the extent to which these drugs are adulterated or are of inferior quality; but from the clinical experience we do feel that there are some drugs of different effective value. It is a patent fact that some European firms that export drugs to India manufacture them specially for India. We cannot understand what difference does it make when they are used in this country. The ostensible plea is the climate which holds good for biological products; but for other drugs we feel that the real point is the cheapness and the inferiority of the stuff they send for our consumption. European firms of countries, where their Governments protect their people by Special Drugs Act, export to India, at times, drugs that are condemned by the authorities for their home consumption. It is a pity that these Governments allow firms to export drugs to India without any State control which they exercise in their own country. We have no requisite knowledge to judge their quality; nor are there institutions, public or private, who can help us in the matter. We rely on the reputation of the firms that supply us and the prices we pay, both of which factors cannot be always reliable. We also feel that high prices, specially of biological products, do not necessarily mean superior quality.

125. Our co-opted colleagues of Lahore also refer to this aspect in their memorandum:

> It is well known that certain firms abroad manufacture drugs specially for the Indian market and in the absence of any control on the quality of drugs manufactured for export, these countries are able to undersell local manufactures by lowering the standard of quality. This dumping of inferior quality goods has its repercussion on the quality of locally manufactured articles in that their quality deteriorates to keep pace with the competitive rates of these dumped goods.

126. The evidence is also replete with instances of fraudulent practices in respect of drugs.

127. Fortunately, evidence based on actual analysis of the drugs is not wanting. Many of the witnesses, especially Chemical Examiners, Public Analysts, Public Health Officers, and officers in

charge of Customs and Excise laboratories had analysed drugs in the course of their duties. Some of the chemists who gave evidence had also done so. The *statements* inserted in the appendix contain the results of analysis which the witnesses kindly furnished to the Committee as well as the list of drugs condemned by them. These show that a large variety of drugs have formed the subject of accurate experimental analysis and observation. The statements constitute depressing reading and reveal a woeful tale.

128. Having regard to the seriousness and far-reaching character of the problem, the Committee felt it to be its duty to arrive at a solution within reasonable bounds of certainty and to exhaust every available resource in furtherance of that end. With a view, therefore, to supplement the recorded evidence and to test its accuracy, the Committee collected certain samples of drugs at random from the different provinces of India and subjected them to analysis under the supervision of the Chairman and one of the members, Mr. Cooper. The list of drugs analysed by the Committee together with the results of the analyses is set out in the Appendix D of Part II. The results confirm the views of the witnesses in all their different aspects and reinforce the impressions previously formed by the Committee. Not only is adulteration common, but many a firm sells packages which are considerably under-weight.

129. The evidence left no room for doubt that, in regard to adulteration, deterioration or tampering with the quality or strength of drugs, very little distinction can be made between imported and locally manufactured medicinal preparations. Even some of the preparations of the Government Medical Stores were called into question by some of the witnesses. Criticisms were levelled against cocaine hydrochloride supplied to the Civil Surgeon of Cochin. It was said that two kinds were received and that the cheaper type did considerable harm, while the better kind was not available. The District Medical Officer, Anantapur, reported that a few drugs, such as chloroform and purified ether, had to be returned under instructions from the officer in charge, as they were found to be unfit for use. Two of the Medical Officers of the Government Hospitals found that tincture of digitalis prepared by the Stores were not above complaint. We have, however, no doubt whatever that the preparations of the Government Medical Stores are generally unexceptionable and of a very high order of excellence and purity.

130. The Committee has considered the problem in all its aspects, and feels convinced that it is justified in coming to the conclusion that the drugs in the Indian market are not above reproach and that many of them are of impure quality and defective strength. The evidence points to the conclusion that the traffic in such drugs is extensive and indiscriminate and that the strong language used by some of the witnesses in characterizing the situation is by no means undeserved or exaggerated. It is

not possible to estimate the exact extent with greater precision. Investigation of the reasons for the existence of this deplorable state does not fall within the province of this chapter.

Chapter II

Known and approved medicinal preparations

Non-Official (General)

131. We have now to consider the extent to which 'known and approved medicines' other than those included in the British Pharmacopœia, mentioned in the second head of reference to the Committee, are of insufficient purity, potency or quality and how the recommendations in relation to the control of drugs of the British Pharmacopœia may be made applicable to them. It may at once be stated that these which may, for the sake of brevity, be called 'non-official drugs' stand on the same footing in regard to the existing state of affairs as pharmacopœial drugs with the exception perhaps of biological products and organo-metallic compounds. It follows that the extent to which such drugs (other than those specified above) of impure quality and insufficient strength are indiscriminately manufactured, sold or imported is the same as that of British Pharmacopœial drugs and the need for, and the methods of, control would also be identical.

132. The two classes of medicinal preparations specified above stand apart and have characteristics of their own which necessitate differential treatment. The Committee consider that the question of control of these products is of great importance to the progress of medical science in this country, to the daily practice of medical practitioners in India and to the safety of the public. The case of each may be examined separately.

Biological Products

133. The better known biological products are sera, vaccines, phages, hormones, and preparations of or from animal glands.

134. The evidence before the Committee regarding biological products was divided. The majority of the witnesses (64 per cent) had no cause to find fault with them, but many of them admitted that they used them to a very limited extent and did not know very much about them. The remainder (36 per cent) found them to be defective and below standard and this group consisted of witnesses who had tried them extensively and in many cases had actually tested them scientifically.

135. Doctor P. A. Mathew, B.A., M.B.B.S., Acting Professor of Bio-Chemistry, Medical College, Madras, remarked: "Biological products suffer from the element of commercialism all over the world

and biological products themselves are only in the experimental stage. To quote only one example: Thyroid gland extracts differ very much in potency in the different commerical samples and the standard of potency is different for different companies. India is not particularly suffering from the sale of any spurious biological products and, until a definite and sufficient scientific knowledge of the biological products is available, it is a bit hard to say whether they are of proper strength at present." The Bombay Medical Union observed " that as far as biological products offered for sale in India are concerned there is no guarantee of purity, nor against loss of potency which may be due to the peculiar climatic conditions in India or the method of storage of these products in this country. We have sufficient reason to believe that, often enough, the biological products that are sold in the market are not of the proper strength." We are in entire agreement with this view.

136. The biological products offered for sale in India are derived from two sources:—

(*a*) Those imported into India from foreign countries.

(*b*) Those manufactured in this country.

The products belonging to the first group are by far the largest proportion of those used in this country. Most of these preparations are manufactured by reliable firms of manufacturers having an established reputation. They employ a competent staff of biochemists and bacteriologists and the products are thoroughly tested by the firms themselves and by the drug control authorities, before they are offered for sale. Even such products have been found to be not up to standard on testing. Doctor Ukil, an experienced bacteriologist of Calcutta, stated in his evidence that he had occasion to test a number of therapeutic sera imported into this country whose strength was much below the titre as mentioned on the label. Others have found that the vaccines met with in the market had deteriorated considerably. Certain gland extracts and preparations have also proved to be defective and faulty. Products made from thyroid, parathyroid, liver, pancreas, adrenals, pituitary glands, etc., varied a great deal in their activity and in some cases were quite inert. Doctor V. K. Narayana Menon of the Bio-Chemical Department of the Medical College, Vizagapatam, found insulin prepared by reliable firms to be absolutely useless, as much as a hundred units not producing hypoglycæmic convulsions in rabbits. Several other experimental workers also had similar experience which they brought to the notice of the Committee. Tablets of gland extracts were actually met with by some in a state of decomposition and unfit for use.

137. The variations in the activity of such products imported into India may be due to several reasons. Firstly, the drug may not be up to the prescribed standard. Owing to the unprotected

condition of the Indian market, the facilities and the temptations for the sale of all kinds of inferior and deteriorated products are many and irresistible. Some of the importers do not hesitate to descend to the vile practice of getting hold of time-expired biological products from the European market and importing them into India and selling them to dealers at a very cheap rate. Secondly, the products when sent out by the manufacturers may be perfectly sound and up to standard, but may lose their activity during transit or storage.

138. Deterioration may occur in biological products through one or more of the following factors:—

(1) *Defective storage.*—This is a very important factor in this country. It is an established fact that biological preparations and opotherapeutic substances are adversely affected by light, heat and moisture. Light has been shown to alter the optical activity which is related to therapeutic activity in say such a product as adrenalin. High temperature in the tropics is known to produce a faint turbidity in the solutions and a flaky or granular precipitate may be found in vaccines and sera even in hermetically sealed and sterile ampoules. Changes are also produced in liquid preparations, powders and tablets, whereby they alter their colour as well as taste and smell.

(2) Breakage, leakage, desiccation and putrefaction may occur in these products during the period of transit and shipment from foreign countries to India. The preparations have sometimes to pass through zones of very high temperature which may affect their activity.

(3) After long and defective storage, some of these products may dissolve a portion of the container, or may themselves undergo autolysis. Both these give rise to destruction of their active constituents and hormonic principles.

139. As regards the second group of substances, namely, those manufactured in this country, the evidence goes to show that products such as vaccines and sera have given entire satisfaction. They are, however, yet produced on a very small scale. Many of the practitioners preferred them to imported products and urged that biological products prepared in India are better than the imported products. The claims were supported on three grounds, namely, (1) that they were likely to be fresh, (2) that the animals and organisms from which they are made have lived under the same climatic conditions as those under which patients themselves live and (3) that they are probably cheaper than those imported from abroad.

140. We have discussed the possibilities of manufacturing these products fully elsewhere. We should like to draw prominent attention to one aspect in connection with their manufacture. At the present time, there are only very few manufacturing firms in India, but with the future extension of the industry, of

which there is every prospect, everything in relation to manufacture will naturally assume importance. The difficulties to be tackled will then become pronounced. We should, therefore, like to state that the manufacture of these products requires special care as the conditions of temperature, pressure, desiccation, combination and conversion are factors of decisive importance with regard to their quality and quantity on the effects they produce. Such products are also liable in the process of manufacture to bacterial contamination and they cannot safely be sterilized by heat or by chemical agencies without seriously impairing their efficiency. They are often given not by the mouth, but by hypodermic, intra-muscular, intrathecal or intravenous injections. The purity, potency and authenticity are, therefore, matters of vital importance. These factors explain many of the contradictory findings with regard to the hormonal extracts. The necessity for stringent tests of these products can, therefore, be easily appreciated. The control as regards personnel and equipment of the manufacturers and the check by bio-chemical and biological assays have to be equally strict.

Organo-metallic compounds

141. Organo-metallic compounds are drugs in which metallic elements occur as part of an organic nucleus.

142. During recent years, a large number of complicated organo-metallic compounds have been imported into the country, those containing arsenic and antimony forming a large proportion. Some of these are also actually manufactured in India. Many of the witnesses complained that some of the organic compounds of arsenic which they had occasion to use produced toxic effect and were therapeutically inactive. It was represented that recently a large consignment of toxic arseno-benzol compounds had been imported by a firm which had bought large quantities of the condemned product from the European market where it was declared unfit for sale. Specimens of this consignment were actually bought and, on test, were found to be unfit for use.

143. Substances included in this group are synthetic chemicals of which the chemical composition of the main product is known but experience has demonstrated that slight and unappreciated variations in the process of manufacture may produce such variations in the properties as to render them highly toxic. The margin between the therapeutic efficiency and dangerous toxicity is a narrow one even in the case of the best preparations. Convenient laboratory tests for their therapeutic efficacy are not yet available. The necessity, therefore, of rigid standards to be applied in the testing of these bodies is evident. It has been shown that samples of organic arsenic derivatives often contain toxic impurities which are difficult to control chemically. Almost all

of these drugs are administered by intravenous injection. Biological tests to guarantee that the toxicity of the preparations is not dangerously high will, therefore, be needed in addition to the criteria of chemical composition which shall ensure that the manufacturer does not correct unduly high toxicity of a preparation by lowering its content of therapeutically active constituent or making a preparation resembling one of these products in its physical properties but having no therapeutic action.

144. Many of the witnesses who could speak with authoritative knowledge pointed out the defects in purity and variations in the potency of these substances. Doctor Napier of the Calcutta School of Tropical Medicine and Hygiene, who has a large experience with the organic compounds of antimony prepared in this country, said about ureastibamine: " but there was undoubtedly a distinct falling off in the quality of some of the preparations that passed through my hands. In the chemical laboratory in the School of Tropical Medicine and Hygiene, a number of samples of ureastibamine were tested; these samples were made by various local manufacturers and were all reputed to be made according to Doctor Brahmachari's original formula, that is to say, they should have contained about 35 per cent of metallic antimony. Different samples were found to contain from 19 to 43 per cent of the metal. The toxicity and the therapeutic quality of the drug varies largely with the antimony contents, so that such variations in the antimony content might lead to very serious results, under-treatment on the one hand and over-dosage on the other." Lately, some of the organic compounds of arsenic of the arsenobenzol series, which are much more toxic than antimony compounds, have also been prepared and are finding their way into the market. Some of these compounds were tested in the Department of Pharmacology of the School of Tropical Medicine and Hygiene and were found not to conform to tests laid down by the National Research Council in England and some of them had very high toxicity.

145. Complicated compounds of antimony as well as of arsenic are now being manufactured in India by anyone who may choose to do so and these potent compounds are put on the market without their strength being properly tested. Their standardization is left at present entirely to private enterprise and to manufacturers. Each maker is free to adopt his own conception of adequate standardization and there is no check whatever by the State. Any guarantee of potency and authenticity depends entirely on the firm of manufacturers. The toxicity of each batch of such complicated and potent compounds is carefully tested in other countries before they are allowed to be sold to the public. No licence is granted to any firm until the licensing authority is satisfied that the personnel and equipment of the firm is qualitatively and quantitatively efficient for the purpose for which the licence is sought. In addition to this licensing system, samples of finished products are tested by the laboratories under State control. While in other countries very

careful watch is kept over these potent compounds, the Indian public is entirely unprotected. The position indeed is discreditable to the country and is a source of great danger to the public.

CHAPTER III

Medicines made from indigenous drugs

146. The term ' indigenous drugs ' in the second head of the reference to the Committee has to be construed as meaning drugs, which are cultivated or grown in India or the source and origin of which is India and the use of which is confined to the practice of the Indian systems of medicine or treatment as opposed to the Western systems. To the consideration of medicines made from such indigenous drugs, it will be useful to preface our remarks with a few words about the evolution of indigenous drugs.

147. In the first place, there are the drugs used in the ancient Hindu medicine. In the Ayurvedic works, there is to be found a remarkable description of the materia medica as it was known to the ancient Hindus. The Indian medicine was at its zenith in the early centuries of the Christian era and the knowledge of the Hindu physicians of that time in the domain of the drug therapy and toxicology was far in advance of the others. They made an immense study of the properties of every product of the soil and systematically devoted their attention to the study of disease and its treatment with drugs. After the successive Greek, Scythian and Mahommedan invasions of India, Hindu medicine declined leaving a rich materia medica behind. With the advent of Muslim conquerors, the decline was even more rapid as the invaders brought with them their own healing systems which were well advanced for that period. A study of the growth of Arabian medicine shows that it was in the domain of chemistry and materia medica that the Arabs added most to the body of scientific doctrine which they originally inherited from the Greeks. During the intimate contact between the old Hindu medicine and the Arabian medicine which lasted for many centuries, there was a great deal of intermingling and each utilized the materia medica of the other. With the decline of the Moghuls, the British rule was established and the Western system was introduced. It was primarily intended to give relief to those who came to administer the country; but, as there was no proper system of medical relief at that time, the newly introduced Western system found its way among the people and was welcomed by them. It also brought with it its own materia medica and there was further intermingling and introduction of new medicinal plants into the country. The combination of all drugs from these sources forms the ' indigenous drugs ' with which we are now concerned.

148. Thus the term ' indigenous drug ' includes the drugs used in the Western medicine which grow in India as well as the drugs

used in the indigenous systems of treatment. We have already considered those belonging to the first group. Preparations made according to Western pharmaceutical methods from drugs used in the indigenous systems of medicine could also be treated in much the same way as pharmacopœial preparations so far as standardization is concerned. Such preparations are chiefly tinctures and extracts which can be tested for the purposes of control even though their active principles are not fully worked out. In considering 'medicines made from indigenous drugs' referred to in the second head of reference to the Committee, we will, therefore, confine ourselves to the control of drugs used entirely in the indigenous systems of treatment. These drugs are prepared according to the formulæ and methods generally accepted by the Ayurveda, the Unani or Tibbi and the Siddha schools of Indian medicine. Such drugs need necessarily to be considered by themselves.

149. It is not our intention to inquire into the value of the indigenous systems of medicine practised in India from the standpoint of science or from the standpoint of art, nor is any such inquiry within the scope of the terms of reference to us. The Committee is not directly concerned with the therapeutic properties of the preparations used in the indigenous systems either. The extent to which indigenous drugs of impure quality or defective strength are manufactured and sold in British India and the necessity, in the public interest, of controlling such manufacture and sale alone fall within the purview of our inquiry. We have been at pains to make this clear in view of the complaint of several of the witnesses in their evidence about the absence of any 'Vaidya' or 'Hakeem' on this Committee.

150. The first thing to be ascertained is whether the drugs, single or prepared, of these systems are ever adulterated and, if so, to what extent. Some of the witnesses have stated that the tendency for adulteration of drugs used by the practitioners of the indigenous systems is negligible as there is no desire on the part of vendors of these drugs to adulterate them. It is stated that the motive to bring down the price, which is generally the inducement behind adulteration, is absent as there is no import and consequently no foreign competition. Assuredly such should be the case if the conditions had not altered considerably during recent years. In olden times the practitioner of these systems used to collect his own medicines and prepare them in his own house under his personal supervision. He knew how to recognize the medicinal herbs he wanted and, therefore, made no mistake. The preparations made from them were in accordance with the instructions laid down in the old books and the chance of error was scanty. He had thus no occasion to think that his patients were getting medicines of defective strength or of impure quality. But though 'Vaidyas' and 'Hakeems' may prepare their own medicines even now, they unhappily are no longer their own collectors and suppliers. Many of the medical herbs collected and supplied in these days are not genuine.

151. It is well known that many of the plants mentioned in the old books are difficult to recognize and the description is not always a safe guide for ascertaining whether the specimens obtained are of the particular drug described. The identification of drugs used in these systems with any degree of exactitude will remain a prime difficulty until certain prominent and decisive characteristics of each drug become established by research. No amount of verbal description of these drugs as given in the books will enable the expert botanist to identify some plants and parts which even in themselves do not invariably present the same characteristics. The result is that there has been a good deal of confusion and many drugs are being sold under different names and different drugs under the same name and even the learned kavirajs and hakeems cannot say with certainty which is the authentic specimen meant in the old texts. Entirely different herbs are being sold in different provinces under exactly the same name. Doctor Lakshmipathi, who has a great deal of experience in these drugs, emphasized this point in his evidence and stressed the importance of careful identification and proper classification of many hundreds of medicinal plants that flood the market and are being extensively used by the practitioners of the indigenous systems. As the managing director of a large manufacturing firm of Ayurvedic medicines, he has had occasion to call for tenders for supply of different drugs for making preparations on a large scale. He met with very unsatisfactory results. Specimens presented to him varied in their activity to an alarming extent and often did not represent the genuine article.

152. Not only for the supply of raw materials does the modern vaid and hakeem depend on others, but to some extent he also relies on them for the compounding of his prescriptions and the preparation of his medicine. Large firms manufacturing Ayurvedic preparations have sprung up and there are also numerous Ayurvedic and Tibbi pharmacies in which prescriptions are dispensed. Since these Ayurvedic and Tibbi pharmacies and manufacturing firms have come to stay, the Government, in the interest of the large majority of the population who use this form of medicament, have the right and duty to inquire into the strength and purity of their drugs and medicinal preparations. That everything is not what it should be is amply borne out by the evidence, written as well as oral, placed before the Committee by the practitioners of the indigenous systems of medicine. It has been said by many witnesses that ' Pansaris ' sell impure and adulterated raw materials. Many of the herbs used in Ayurvedic medicine which are not procurable are substituted and spurious products which defy detection are sold in the market. It is well-nigh impossible under the present circumstances to procure pure and genuine raw materials. Very often, in compounding preparations, certain ingredients which are not available in the market are simply omitted and in some cases certain ingredients not mentioned in the texts at all are added.

153. The condition of medicines used by hakeems is no better. A number of Tibbi practitioners who gave evidence bore testimony to this fact. The *Baniahs* or *Attars* who stock these medicines keep old stuff which is often deteriorated and quite inert. In many cases, where genuine drugs are not available, some sort of substitute is sold. Herbs are not properly preserved or stored and are often stale and are kept mixed with other herbs. It is alleged that even the best Tibbi dispensaries in India cannot reasonably claim the merit of absolute purity for their stocks, as even they have also to eventually depend on the *Attars* who generally purchase the cheapest quality from the collectors for their supply. Another reason for the widespread adulteration of drugs is to be found in the existence of the large number of quacks or charlatans who parade in the villages under the names of vaidyas and hakeems. They have not studied these systems properly or systematically and are, therefore, ignorant of the materia medica.

154. Witness after witness denounced the vegetable drugs sold in the bazaars which they said were very bad and often not what they were supposed to be. It is abundantly clear that not only the single drugs sold in the bazaar and used by the practitioners of the indigenous systems of medicine are of inferior quality and defective strength, but, as a consequence, the compounded preparations are also far from being reliable. So deplorable is the state of these drugs that many of the practitioners of the indigenous systems of medicine have started using the Western medicines disguised in the form of their own preparations.

155. There is another aspect of the question which should not be forgotten. Many of the practitioners in these systems use potent and toxic substances over which control is absolutely essential. Some of the witnesses cited instances of poisoning and of fatalities due to the indiscriminate use of potent drugs of unknown strength, which indicate the grave danger the public run under present conditions. It has been said by eminent witnesses that if adulteration goes unchecked in the preparations of indigenous systems, the very object of controlling the Western medicinal drugs will be defeated.

156. A very large proportion of the population, particularly in the villages and small towns, resort to indigenous systems of treatment and, as pointed out by the Bombay Medical Union, it follows that, if any legislation is undertaken for insuring the purity of drugs, it should not be confined to drugs used by a small section of the population, namely, those resorting to the Western system of treatment only. We are disposed to agree that legislation which aims at controlling the B.P. drugs without touching the drugs used in the indigenous systems will be truncated and lack in completeness or perfection and that, in consequence, the situation is undoubtedly such as to call for control. But is the control of these drugs a possibility?

157. The Bombay Medical Union frankly stated that they had no suggestions to offer to improve the situation as they had practically no knowledge of those systems of medicines or of their Pharmacopœia. They, however, expressed the view that it should not be difficult or beyond the resources of modern science to investigate into the composition of these drugs and to standardize tests for their effectiveness as various herbs and drugs had been tested in the past in India, as shown by the reports of the Indigenous Drugs Committee, and are being tested here and in some of the continental laboratories such as those of Germany and the United States of America. But the Drugs Manufacture Committee, to which apparently reference is made by the Bombay Medical Union, recorded it as their opinion that though the value of indigenous drugs not included in the British Pharmacopœia should be investigated it cannot be done until an institute for the physiological standardization of active principles of drugs is established. In their view, the establishment of such an institute was a condition precedent to the tackling of the problem with any measure of success.

158. Many of the witnesses gave evidence showing the utter impossibility of such a control. Some of the indigenous practitioners objected to it on merely sentimental grounds saying that there is something higher and more vital in their systems which is inscrutable and impenetrable by modern science and which modern chemists cannot analyse and determine. We know what hold conservatism has and how slow we move when the question of sentiment is raised. Others reasonably contend that the materials used by the indigenous practitioners are derived from every source in nature, animal, mineral and vegetable, and in many instances the nature and quality of the materials used is known only to the person who dispenses it. To control such materials by application of scientific principles would be a formidable task indeed. The composition of the majority of these drugs is not known and therefore standardization would not be possible in the same sense as with the Western medicines. Standardization presupposes a knowledge of the chemistry, the pharmacology and the therapeutics of the drugs, which are unknown in this case. Unless and until these drugs are investigated on scientific lines, control is not feasible. The useful remedies should be separated from the inert and useless by a proper scientific study and the potent drugs should be analysed and standardized before any steps can be taken.

159. Standardization would be even more difficult, if not impossible, in the case of compounded preparations which constitute nine-tenth of the total preparations in use. A dozen or more herbs, of unknown composition, and metallic substances are sometimes mixed together, and no two samples of the same preparation are said to agree in composition as the directions laid down in Ayurvedic books are rarely followed. Evidence of notable hakeems also disclosed the fact that there was no standard pharmacopœia for Unani

medicines. *Quarabadin*, which serves this purpose, is not always followed by the hakeems. They often diverge from the original formulæ and introduce their own changes. Preparations made by different hakeems under the same name exhibit very wide variations from each other.

160. As regards purely metallic preparations, control could perhaps be efficiently exercised. Doctor Neogi, Professor of Chemistry, Presidency College, Calcutta, was engaged in the analysis of such preparations for years. He found that no two samples of the same preparation agreed in their composition even in colour. He hoped that a Board composed of chemists, medical graduates and eminent kavirajs trained in modern sciences would be able to evolve some method of standardization of these metallic ingredients of Ayurvedic medcines. The witness admitted that the metallic preparations of Ayurvedic medicines formed simply a proverbial drop in the ocean and that their analysis and standardization would not land us any nearer to the goal.

161. It will be thus perceived that if standardization of drugs and preparations used in the indigenous systems is to be made the *sine qua non* of their control, little help, if any, is to be expected from the Western scientists at the present time. The Zandu Pharmaceutical Works, Bombay, who manufacture these preparations on the most up-to-date principles, maintain that no Western chemical test would be applicable to Ayurvedic preparations. As, however, the control has been insisted upon by many eminent witnesses and by such a body as the Bombay Medical Union, we investigated the possibilities of its being effected by other methods. We naturally turned to the practitioners of the indigenous systems, who could speak with inside knowledge, for their helpful suggestions.

162. Mr. K. Protab Sinha, Superintendent of the Ayurvedic Pharmacy, Benares, while agreeing that control was necessary, suggested that in their books there were standard prescriptions and it ought to be quite possible from the physical characters of these preparations, e.g., solubility in water, turpentine and alcohol, to determine whether the things are genuine or not. Chemical tests could be easily worked out for the mineral preparations. Most of the other witnesses, however, were less sanguine. The considered opinion of the staff of the Government School of Indian Medicine in Madras was that standardization and control was not possible under the present state of knowledge regarding these drugs. They said that if intensive research was carried out on these drugs with the co-operation of chemists and pharmacologists, standardization and control might be possible in a period of fifteen years. Some of the other prominent vaidyas and hakeems have also expressed similar opinions.

163. The notable suggestions for improvement and some measure of control which some of the witnesses made may be summarized as follows: To obtain pure raw material, it would be necessary to

prohibit ordinary persons in the bazaar from selling medicinal herbs. Such sale should be strictly restricted to qualified herbalists who should get their training under learned vaidyas and hakeems. The shops selling drugs should be regularly inspected by inspectors well-versed in the knowledge of Indian medicinal plants. It was also suggested that there should be collections of authentic drugs for purposes of reference and comparison. Gardens should be started for growing medicinal plants in various centres under the supervision of learned indigenous practitioners. Ayurvedic and Unani schools should be started for the proper training of indigenous practitioners and only those persons holding diplomas from authorized bodies should be allowed to practise the healing art after due registration. Persons trained under such conditions, it is believed, will ensure the purity of medicines they use. Some have gone so far as to say that Government should issue licences to all sellers of herbs and drugs and all persons who compound medicines. Anyone found selling these drugs without a licence should be punished. Inspectors should be appointed from among the indigenous practitioners and should have special knowledge of herbs and drugs. Special schools should be started for training manufacturers of drugs, and dealers who manufacture compound medicines should be obliged to employ them.

164. Most of the questions involved in these proposals are beyond the competence and terms of reference to the Committee. To investigate them fully will require experts who have a thorough knowledge of these systems and the conditions under which they are practised at present in India.

165. The Committee, after careful consideration of the voluminous evidence on this question, and with special regard to their terms of reference, can only come to the following conclusions:—

(1) That many of the crude single drugs as well as the compounded medicines used in the indigenous systems of treatment and offered to the public for consumption are adulterated and of poor quality.

(2) That, in the interest of the majority of the public in this country who use them, they should be brought under some control.

(3) That, in the absence of standards, these drugs cannot be controlled on the same lines as drugs and chemicals recognized by the British Pharmacopœia and other western preparations.

(4) That the drugs and preparations of indigenous systems of treatment should be kept entirely separate at present.

(5) That, before any step can be taken to control the purity of such drugs and preparations, the systems of Indian medicine should organize themselves, by having an uniform curriculum worked out for the instruction and training of the practitioners throughout the country.

(6) That the practice of Indian medicines should be restricted to properly trained, qualified and registered practitioners.

(7) That only persons with expert knowledge of these systems can initiate steps to standardize the drugs and preparations they use with a view to bring them under control.

Chapter IV

Patent and Proprietary medicines

166. A ' patent medicine ' is a drug which is patented, or the name of which is patented; but usually and, less properly, any drug the manufacture and sale of which are restricted in any way, whether *by patent* of substance, name, label or the like or *by secrecy* as to the nature and method of preparation.* Properly speaking, ' patent medicine,' technically so described, means that which the words express *prima facie*—medicine, the owner or maker of which has obtained letters patent under the great seal for it, conferring on him the exclusive right to make or sell it. But, broadly speaking, the words are now applied to secret proprietary medicines or nostrums. They are not patented medicines, and most manufacturers rely on their secrecy for their protection. Sometimes the expression ' proprietary medicine ' is confined to unofficial package medicines of known composition, bearing trade-marked names, sold for the purpose of prescription and advertised only to the medical profession and ' patent medicine ' to unofficial package medicines of unknown composition, bearing trade-marked names, and advertised and sold directly to the people for self-treatment. But, in question No. 9 of the questionnaire issued by the Committee and in the answers of the witnesses, no such distinction is maintained between the two. The expressions ' patent medicine ' and ' proprietary medicine ' are, on the other hand, used indiscriminately, as though they were synonymous, to apply to all non-official package medicines which are sold or advertised wherein a monopoly or proprietary right is claimed, irrespective of the fact that they are advertised to the public or to the medical profession or that their formulæ are disclosed or kept secret. These expressions are used by us in this general sense.

167. In one of the preceding chapters†, we have referred to that class of proprietary and patent medicines the formulæ of which have already found their way into standard formularies on account of their well-known character and general usefulness. We observed therein that they fall under the description of ' known and approved ' medicines and as such should be subjected to the same

* The Century Dictionary, Volume V. † Chapter II of Section III.

control as the Pharmacopœial drugs. The other class of patent and proprietary medicines of which the formulæ are not either disclosed or, though known, have not received any ' approval ' remains to be dealt with. Of these, some are reputed household remedies such as Beecham's Pills, Chameleon Oil, Cuticura, Eno's Fruit Salt, Evans's Pasilles, Mariani Wine, Mother Seigel's Syrup, Scott's Emulsion, Wincarnis, Zam Buk, etc. Speaking strictly, they cannot be regarded as ' approved,' and they fall outside the purview of the description ' known and approved.' Our present purpose is to examine the necessity for establishing some sort of control over the manufacture, sale and importation of patent and proprietary medicines which are not ' approved.'

168. There are, no doubt, some witnesses like Mr. Chattopadhyay of the Scientific Supplies (Bengal) who would exclude kaviraji and hakeemi proprietary medicines from the scope of any proposal for control. But Mr. Selvanayagam, our co-opted colleague of Madras, is positive that " in the interests of the public the indiscriminate sale of proprietary medicines supposed to be made from Ayurvedic or Unani prescriptions containing potent drugs and poisons the formulæ of which are not disclosed, should be brought under control." Even some of the witnesses like Doctor Naliniranjan Sen Gupta of Calcutta, who did not disguise their opposition to official interference of any kind over indigenous preparations had no objection to control over indigenous proprietary remedies, if gross abuse or positive danger is proved. Patent and Proprietary medicines with secret formulæ, whether indigenous or not, play such an important part in the life of the people of this country that our enquiry would be imperfect and defective and lose much of its value if we failed to bring them within its scope. We shall, therefore, deal with patent and proprietary medicines as a whole, irrespective of the particular systems to which they belong.

169. In England, as the result of the persistent efforts of the British Medical Association and its journal in regard to patent medicines, a Select Committee was appointed by the Parliament in 1914 to report upon the extent of the sale of patent and proprietary remedies and of the necessity for legislative interference to restrict or regulate it. The Select Committee held a public enquiry and found that there was an enormous traffic in such remedies which was highly objectionable and which constituted a grave and widespread public evil and that the existing law was chaotic and inoperative. In the British Dominions and in foreign countries, several legal restrictions exist to control the distribution of patent and proprietary medicines. In India, not even a serious study of the extent to which such medicines have been used by the public has yet been made. There are, therefore, no authoritative data available to the Committee, to start with, on the subject of the inquiry.

170. That a considerable business in patent and proprietary medicines is done in India is obvious from the following figures for imported articles:—

	Rs.
1927–28	29,26,782
1928–29	42,83,667

According to the Bombay Medical Union, Great Britain contributes to the import into India of proprietary drugs of the value of 23 lakhs of rupees per annum. Mr. Selvanayagam stated in his memorandum that "the Madras market is flooded with synthetic and proprietary drugs chiefly from Germany, Switzerland, Austria, etc." In addition to the imports, the replies to the questionnaire admitted to the manufacture of 36,350 gallons of liquid and 196,100 lb. of solid proprietaries. These figures can represent only a small portion of the whole trade as they do not include the secret remedies which are being manufactured all over the country. Apart from foreign preparations, which are imported, a considerable number are actually manufactured in India. This is revealed by the fact that by far the largest number of advertisements in nearly all the newspapers are for this class of commodity. The advertisements in newspapers also testify to the extensive trade in both the Indian and the foreign products of this nature. It may, therefore, be safely assumed as an incontrovertible fact that they are imported, manufactured and sold to a considerable extent all over India.

171. The evidence on record is also to the same effect. Nearly all the witnesses refer to the large and increasing sale of proprietary medicines with secret formulæ. Doctor U. Rama Rao endorses the view of Doctor Sidney Hillier that hospital and dispensary patients have squandered more money on quack remedies than they would have paid for proper medical advice and treatment. That the Indian market is inundated with proprietary medicines, both foreign and Indian, and that the pace at which it takes place is alarming is the wail of medical practitioners, medical associations, laymen and even of some of the chemists and druggists who do large business in such products. Doctor Parulkar of Bombay, Captain Maneckshaw of Amritsar, Doctor Tirumurti of Vizagapatam, Major Sahai of Kohat, Doctor Ukil of Calcutta, the A.D.M.S. of Madras district, Doctor Phani Bhusan Mukerji of Patna, Doctor Noronha of Bangalore, Doctor Rodrigues of Karachi, Doctor Lakshmanaswami Mudaliar of Madras, the Bombay Medical Union, Mr. Sethi of the United Provinces, Messrs. B. K. Paul & Co., Calcutta, and Francis Medical Hall, Rangoon, are some of those who speak to the import, manufacture and sale of such medicines in India on a wide scale. Lieutenant-Colonel Cook of Bhagalpore summed up the position thus: "A glance at the trade returns of drugs and medicines (excluding chemicals and narcotics) in the sea-borne trade statistics of British India* will convince anybody of the truth of the statement that the sale of proprietary and patent medicines is

* See Chapter III of Section I.

increasing by leaps and bounds " and that " the proprietary medicines and other allied rubbish that are poured into this country and made in this country are increasing year by year."

172. As supply is ordinarily dependent on demand, the magnitude of the import, manufacture and sale of such medicines may also be taken as connoting the magnitude of their use and popularity among the public in India. The witnesses also testify to it in emphatic terms. Doctor Noranha of Bangalore stated that the sale is increasing and that the public consume them voraciously. This leads up to the consideration of the main problem, whether the trade in patent and proprietary medicines, which has assumed such dimensions and which appears to flourish and gather strength as time goes on, should be checked or regulated to any extent? In other words, is it necessary for the State to intervene and protect the public from the domination of these medicines in any manner? The answer would obviously turn on the further question whether such medicines serve any useful purpose in the scheme of life and their influence on public health is wholesome or beneficial. In this connexion, a correct understanding of the true reasons for the great hold which these medicines have on the public will not fail to be of immense help.

173. In the investigation of reasons to account for the acknowledged popularity of patent and proprietary medicines, the place of pride must be accorded to ingenious propaganda, clever and attractive dissemination of their supposed virtues and wide and alluring advertisements. The credulity and gullibility of the masses, especially when ' certain cures ' are assured in utterly hopeless cases, can well be imagined. Perusal of the advertisements of ' cures ' produces a great effect on patients who have tried treatment by medical men without success. Such patients resort to any and every drug that comes in their way. In an infinitesimally small number of cases spontaneous cures are also effected. Widest publicity is given to these and the preparations become invested with miraculous virtues. The reassurance of cure, the force of argument advanced to guarantee it and the certificates of persons said to have been cured which are all set out in advertisements make a deep impression, especially on those with weak nerves. The love of mystery and secrecy inherent in human nature, the natural disinclination and shyness to disclose details of one's illness especially those involving moral turpitude, the peculiar temperament of the people who, high and low, rich and poor, demand ' something in a bottle ' for the treatment of every ailment and the poverty of the people who cannot afford to pay the doctor's bills or the high prices current for dispensed medicines, have all been enlarged upon as tending to self-diagnosis and self-medication by patent and proprietary medicines. The fact that a number of these drugs have some value and are efficacious on account of their excellent combination and the circumstance that the medical practitioners frequently prescribe them are also urged in their support.

According to Doctor Frank Noronha of Bangalore, the advance of endocrinology and vitaminology has given an impetus to the growth of proprietary medicines.

174. Notwithstanding the usefulness of some of the patent and proprietary medicines, an overwhelming number of witnesses deprecate the increasing sale of proprietary medicines, particularly those with secret formulæ. Not a few consider such drugs positively harmful and believe that they are a ' serious and increasing menace which is frequently fraudulent.' The question may be examined from two standpoints, their effect on the people at large and on the medical profession in particular. Patent and proprietary medicines in the field have extraordinary range and sweep. The Select Committee of the House of Commons on Patent and Proprietary Medicines classified these widely differing remedies thus (*a*) genuine scientific preparations, (*b*) unobjectionable remedies for simple ailments and (*c*) many secret remedies making grossly exaggerated claims of efficacy ; causing injury by leading sick persons to delay in securing medical treatment ; containing in disguise large proportions of alcohol; sold for improper purposes; professing to cure diseases incurable by medication ; or essentially and deliberately fraudulent. The Committee found that ' the third class (*c*) contained nothing which sprang from therapeutical or medical knowledge.' The classification holds good for India also. It will be perceived that while there are valuable products, which may be said to extend the armamentarium of the physician there are also positively injurious and fraudulent combinations and between these two extremes there are products with varying characteristics.

175. The most perfunctory study of the advertisements and pamphlets issued in connexion with patent and proprietary medicines will disclose ' fraudulent practices of a most abominable character.' Extravagant claims, grossly in excess of those justified by the ingredients, are made without the slightest regard for truth. The books entitled ' Secret Remedies: what they cost and what they contain ' and ' More Secret Remedies: what they cost and what they contain ' published by the British Medical Association have exposed the fraud ruthlessly. The results of the analysis of many medicines showed that they often contained cheap substances which had no medicinal effect. The cost of the ingredients bore no relation to the price actually charged. That they are unnecessary and act as a drain on the national purse is stressed by Doctor Phani Bhusan Mukerjee of Patna.

176. The misery, breakdown in health and mortality that might follow the use of some of the patent and proprietary medicines cannot possibly be overestimated. Doctor Manekshaw stated that many European and Indian patients using them came to grief. Doctor Chaube of Delhi conceded that the majority were of doubtful value although none had proved fatal to his knowledge. The Parliamentary Select Committee found that much harm resulted from the use of such medicines in negative as well as positive ways.

A patent medicine might be positively injurious and cause direct harm as some of the constituents might be potent and dangerous. Many drugs which are good and efficacious in skilled hands might have the reverse effect if handled by inexperienced people, such as aniline drugs, headache powders and remedies for sleeplessness. Some medicines might also have the effect of masking the early symptoms of serious and grave diseases and assuaging them for a short period which would result in delaying scientific diagnosis and treatment. Most valuable time might thus be wasted and investigation delayed until it is too late to do anything. Some medicines are indirectly recommended for illegal purposes such as abortion. These are some of the main reasons for discouraging the use of patent and proprietary medicines.

177. The production of such medicines prejudices the legitimate use of approved remedies and leads to what may be called ' proprietary prescribing.' The practitioner is not left unaffected by the propaganda in furtherance of such medicines. Its action on him is in the nature of a ' compelling suggestion.' The number and variety of such medicines ' creates a feeling of uncertainty, lack of confidence in himself, fear of delay and the sense of not being up to date.' The practitioner has not often the strength of mind to resist the demand of the patient for a ' new remedy.' Doctor Maneckshaw of Amritsar denounces the medical man roundly and attributes ' proprietary prescribing ' to his desire to find a short-cut for every cure, the rarer the better ; and the Chief Medical Officer of the B.B. and C.I. Railway describes the present-day doctor as more gullible than the credulous public.

178. The countenance given by some of the medical practitioners to such medicines is accounted for as being due to the uncertainty as to the purity and potency of most of the medicinal drugs for sale on the Indian market. Messrs. Smith, Stanistreet & Co. observe that proprietary prescribing is due to the desire to ensure getting something which is of definite standard and strength, while, if pharmacopœial preparations are prescribed, there is no knowing as to what will be given and the strong probability is that it will be below strength, or inert or possibly harmful. Mr. Walmsby of the Planters' Stores and Agency Company, Dibrugarh, stated that most of the imported proprietaries have some value and that the medical profession prescribed them through fear of the drugs used in their prescriptions being inert or below strength. Mr. Manmathanath Chatterjee of the Whitehall Pharmacy, Calcutta, attributed the resort to such medicines as being due to the ineffectiveness of the drugs used by dispensing chemists.

179. The position of proprietary medicines with their formulæ disclosed is ethically sound. They are manufactured by firms of repute and their definite composition makes it possible for the conscientious practitioner to judge for himself of their possible value as therapeutic agents. The physician, by prescribing them, knows that his patient will receive something which has been prepared

with skill and accuracy and upon the purity and efficacy of which he can depend. Proprietary prescribing is not, however, without its drawbacks:—

(1) The physician prescribes a drug under the name he remembers best and frequently drugs continue to be prescribed under their proprietary names long after pharmacopœial preparations have become available. Some remedies, for example, theobrominæ et sodii salicylas (theo-sodo-sal), widely advertised years ago as diuretin, are now occasionally prescribed under their proprietary names because physicians forget for the moment their real composition.

(2) Another objection is the added expense in the purchase which is passed on to the ultimate consumer, the patient. The physician who, in writing a prescription, calls for hexamine under the proprietary name Urotropin instead of under the official name, makes it necessary for his patient to pay nearly four times as much for the chief ingredient. Obviously, it is economic waste, as well as scientific fallacy, to prescribe drugs under proprietary names when they are official in the Pharmacopœia.

(3) Proprietary mixtures are needlessly complex, and, if the patient requires a certain remedy, it is hardly fair to burden him thoughtlessly with a lot of other things he does not need.

(4) Proprietary prescribing tends to increase self-medication and may lead to the formation of a habit. Patients may come to feel that it is essential for them to take some special drug, often very expensive, in order to maintain their health. More serious still, a patient, knowing what has been prescribed, will recommend the same to a friend whom, in his ignorance, he believes to be suffering from the same complaint as himself. It may be said that no patient should take any medicine except on a physician's prescription, but for obvious reasons it is plain that the time will never come when such a state of affairs will exist. The danger to the public of self-medication which begins through the prescribing for patients of proprietary medicines by physicians is serious enough to call for a careful review of prescribing by the profession. The evils of proprietary prescribing arise not from the mere fact of the sale of a drug under a proprietary name, but from the circumstances attendant on its distribution and its popularization.

180. Most disconcerting in this respect is the ease with which a preparation of indefinite composition or of definite secrecy can still be foisted on some thoughtless physicians who have not been adequately trained in such fundamental subjects as chemistry and pharmacy, or who have neglected to keep abreast of progress in these basic sciences. Even admitting the plea of ignorance of chemistry and pharmacy, which is but too common, a physician who uses a remedy the composition of which is kept secret, even in part, is not doing his duty to his profession or to his patient.

181. The Committee is satisfied that the traffic in secret medicines is enormous and that the use of such medicines by the people is extensive. The Committee feels no doubt that the consumption of secret remedies is generally bound to cause incalculable harm and disastrous results to the health and welfare of the people. The Committee considers that the characterization of the situation by some of the witnesses as 'a grave menace to the public health' is well merited and nothing but just. We are, however, anxious to dispel one possible misunderstanding. As we have already stated, we are aware that in the field of patent and proprietary medicines there are several well-known simple and useful remedies of great value and that we are not against proprietary medicines *as such*. There are many which are not only harmless, but efficacious and, as mentioned by Lord Dawson of Penn in his speech in the House of Lords during the passage of the Proprietary Medicines' Bill, 'they had not only a physiological basis for their efficacy, but also a psychological basis. If a man found his symptoms set forth in lurid print, which described a massed attack by microbes on his entrails, and if he saw side by side with that wonderful picture a remedy that was going to remove it, to give a victory over pain, that inevitably would, if suitably advertized, have a greater effect in cure than the same ingredients prescribed under a prosaic prescription. Supposing that was true, provided that a remedy was harmless, why should they remove the illusion? Therefore they must not neglect the psychological basis of patent medicines.' But the difficulty is one of discriminating between the good and the harmful from among the multitudinous varieties which are on the market. Nor is the importance of the proper and discreet use of such remedies by any means negligible.

182. There are at present no laws in India to check or regulate the import, manufacture and sale of secret remedies except in so far as they contain poisonous drugs, dangerous drugs, etc. In view of the conclusion reached by us, it would follow that the need for taking steps to check or regulate them is pressing and long overdue. There are, however, some who consider control to be either impracticable or useless and are consequently in favour of non-interference. The Civil Surgeon of Hazaribagh is against control, as proprietary medicines with secret formulæ are very popular and control would be unpopular and ineffective. Doctor Somerville of Tinnevelly does not want any scheme for control, as proprietary medicines are usually harmless and there is very little control in England. The proprietor of New Medical Hall, Moulmein, is not unduly troubled by such medicines. He says 'allow them to go on as long as revenue comes in' and has great faith in the theory of the survival of the fittest. The Superintendent of Central Jail, Hazaribagh, and the Civil Surgeon, Saugar, are of the same way of thinking. The representative of the Edward Medical Hall, Multan Cantonment, has confidence in the discretion of the public and would permit the use of such

medicines by those who need and can afford to buy them. Messrs. Jagat Singh & Brothers of Peshawar are for leaving things alone. Doctor Chaube of Delhi is of the same view as the use of such medicines is confined to the literate who ought to know better and who should 'get their lesson' for their wilfulness. Lieut.-Col. N. S. Sodhi, I.M.S., of Lahore would wholly rely on the efficacy of educational propaganda though he is sceptical about its success. The cheapness of patent medicines appeals to the Civil Surgeon, Allahabad. He would not on that account interfere with a large part of the trade. As regards those which are fraudulent, the difficulty of handling the situation and the fact that they are rife in other countries scare him away. That a control of some kind should be exercised over the import, manufacture and sale of proprietary medicines in the Indian market, is the opinion of 95 per cent of the witnesses. We are emphatically in favour of control and would strongly condemn the policy of *laissez faire* advocated by some of the witnesses. As to the exact nature of the control which should be exercised over patent and proprietary medicines, there is some cleavage of opinion which will be examined in Chapter VIII dealing with the "Methods of Control."

Chapter V

The profession of Pharmacy

183. There is no organized and self-contained profession of pharmacy in India in the sense in which it exists in other parts of the world. In this advanced age of systematization and method in every department of life, this may sound strange, but it is none the less literally true. The profession here is represented by a set of people known as compounders whose status, functions and duties are ill-defined and improperly understood. They carry on the compounding, dispensing and selling of drugs and chemicals from day to day. They handle drugs and poisons with the utmost ease and freedom and in many cases in ignorance of their properties and potency. They also do work as dressers and laboratory assistants in some of the hospitals and dispensaries. Anesthetists and operation assistants are sometimes drawn from their ranks. The list of their manifold duties does not end there. In some places, they pose as physicians and surgeons and acquire a position and income by no means inglorious or negligible. In respect of qualifications justifying the role they fill, they have little or none to boast of. Their standard of education is low and not much is expected of them by way of professional training. This description which is drawn with restraint and moderation will suffice to show how they differ from the pharmacists of the Western countries who are required to have a thorough knowledge of the science of pharmacy and of the manufacture and analysis of drugs.

184. The Committee received and heard a large amount of evidence about the character and quality of the work turned out by the compounders. It gained commendation from very few

witnesses only. Charges of inaccurate dispensing, deliberate dishonesty, negligence, carelessness and lack of any sense of responsibility have all been profusely levelled against them. Doctor Sahai of the King George Medical College, Lucknow, and Lieutenant-Colonel Sen of Cachar, among others, speak as though inaccurate dispensing is the usual rule. The former referred to concrete instances of mistakes like reading and dispensing 'Ext. Bellad. Liq.' for 'Ext. Belæ Liq.' with the unfortunate results attendant upon them. Major General C. A. Sprawson, Surgeon-General with the Government of Madras, ascribed inaccurate dispensing not merely to ignorance, but also to the dishonesty of the compounders. Doctor Venkatachalam of the Madras Medical College stated that 'dispensing of less than the prescribed quantities of rare and costly drugs is common in some quarters as has been recently proved by examining test prescriptions containing, e.g., potassium iodide.' The misappropriation of costly drugs and their substitution by drugs of inferior quality or defective strength by compounders is said to be a common experience of many medical men. The Civil Surgeon of Singhbhum had such experience with potassium iodide and quinine mixtures. In a case mentioned by the Civil Surgeon of Monghyr, the substitution or omission of drugs was due to the fact that the required ingredients had run short or were not stocked.

185. Another complaint made against the compounders is that they mix ingredients on guess work without taking the trouble of measuring or weighing the drugs. Specific instances of slipshod work are on record. The Civil Surgeon of Singhbhum had the remarkable experience of being supplied with pure water as quinine mixture. Doctor Krishnaswami of Vizagapatam speaks of quinine poisoning by over-dose, the putting of croton oil into a patient's eye instead of atropine on account of wrong labelling and the wilful tampering with doctor's prescriptions by compounders in small hospitals out of spite or greed. These instances have been selected at random, but their combined effect is crushing.

186. The few witnesses who championed the cause of compounders did so faintly or half-heartedly. The view of the Chemists' and Druggists' Association, Madras, that the men engaged in the profession satisfied the ordinary requirements for all practical purposes has to be read subject to the admission about the advantages of better training. The eulogies of the Civil Surgeon of Allahabad are neutralized by the prefatory reference to the limited education of the compounders. Out of 401 replies received in response to the questionnaire issued by the Committee, nearly 61·8 per cent of the witnesses have reason to find fault with compounding. The percentage of the witnesses who gave oral evidence is 62·3.

187. The weight of evidence is, therefore, decisively against the competency of the present day compounders. We are convinced that acute dissatisfaction is felt by the public and the medical men all over India in respect of the profession of pharmacy in general

and of the work of the compounders in particular. The reason for this is not far to seek when it is remembered how intimately connected the profession is with the health and well-being of the people at large. We have no doubt that the condition of the profession is deplorable and its degenerate state cannot be exaggerated or over-emphasized. There is no pretence at the cultivation of the science of pharmacy *as such*. Pharmaceutists of the Western type who are conversant with the science of pharmacy and are able to carry on the duties of manufacturing and analysing drugs have not received recognition as a class. The mere compounders who mechanically carry on the art of dispensing have neither the general education nor the special training to befit them for the efficient discharge of their responsible duties. It is no wonder that they are found wholly unequal to their work. The surprise is how they carried on thus far and how their condition and work failed to attract earlier notice or eluded vigilance and reform until now.

188. Investigation of the qualifications and training of those who carry on the onerous and arduous duties of a compounder tells a sad tale and affords ample justification for the gloomy picture drawn above. No definite and uniform standard of training and qualifications is enjoined by the State in the different provinces of India. The whole system is in a state of chaos. In certain Provinces, under the provisions of the Municipal Acts, all chemists' shops are obliged to employ qualified compounders for the compounding, dispensing and selling of drugs. In these places, rules have been framed by the Local Governments concerned for the systematic training of the compounders in the medical schools or colleges or hospitals, as the case may be. In other Provinces, there are no regulations whatever; but a class of compounders are trained in the district hospitals and medical schools for the convenience of the Government and the Local Board hospitals. The training is usually for a period of nine months with certain exceptions. We set below the standards of qualifications obtaining in the different provinces of India so far as they have been available to us.

Bengal

189. The training of compounders has been recently improved (July 1928). Previously, the student was required to undergo a course of study and instruction extending over a period of one year only. The present course includes a period of study for two years. The minimum basic qualification has also been raised.

Preliminary educational qualifications.—Only those candidates who have passed the Matriculation Examination of a recognized Indian University, or an examination accepted by the Governing Body of the State Medical Faculty of Bengal, as equivalent thereto, shall be admitted into the institutions authorized for the training of compounders.

Course of training.—The course of training is of two years' duration—

(*a*) The first year of training should be spent at some specified institution during which period instruction will be given in materia

medica, in reading prescriptions and writing labels from prescriptions, in the laws regulating the sale of poisons, in doses, incompatibilities and the recognition of drugs and in practical pharmacy. In every institution in the course of one year a minimum of 50 lectures, 50 demonstrations and 100 practical classes will be held. Every student should attend at least 75 per cent of the total number of lectures, demonstrations and practical classes held. This course of training will be followed by the first examination at which he must obtain at least 50 per cent of the total marks and not less than 50 per cent of the marks allotted to the practical part of the examination.

(*b*) The second year of training will be taken after passing the first examination and will consist of an apprenticeship for a period of one year in a chemist's or druggist's establishment, or hospital or charitable dispensary which has already been duly recognized for this purpose or may hereafter be recognized by the Governing Body of the State Medical Faculty of Bengal. The Governing Body will fix the number of apprentices who may be under training at any one time in each establishment or institution.

Assam

190. No preliminary qualification is enforced. The period of training is for one year. Rules laid down for the training of compounders follow those in force in Bihar and Orissa.

Bihar and Orissa

191. Rules have been laid down for the grant of certificates to the compounders in October 1926.

The course of training extends for a period of one year and the candidates are required to attend the training classes in certain specified medical schools and institutions approved by the Inspector-General of Civil Hospitals. The candidates should not be less than 17 years of age.

The curriculum includes—

(1) Instruction in Materia Medica, (2) Practical Pharmacy, (3) Reading in English and writing, from dictation, in English prescriptions and labels for prescriptions, and (4) Compounding, mixing, preparing and dispensing drugs.

Madras

192. This is the only province where pharmaceutical education has been accorded some measure of consideration. There are two classes of people carrying on the business in drugs—the *compounders* and the *chemists and druggists*.

The compounders' course includes a period of study for nine months. The standard of minimum educational qualification is the passing of the IV Form examination, with a fair knowledge of the vernacular and ability to write a good hand. The training is

imparted at a hospital or major dispensary. The course includes instruction in 'First Aid' over and above the items laid down below:—

(1) The equipment of a dispensary.

(2) The British and metric weights and measures; the weights and measures of the apothecaries' system; the fluid, grain and the drop.

(3) The British Pharmacopœia and its uses. The galenical preparations (official formulæ) of the British and the Indian Pharmacopœias, the doses of the most important of them, including the doses of all poisonous preparations.

(4) The prescription; the label, the distinctive labels of poisons and of drugs for external use, weighing and measuring of liquids and solids. Ability to read any prescription and to explain the order of dispensing it. The importance of not altering, omitting, or introducing substitutes for any part of the prescription without orders from the prescriber.

(5) The mixture: how dispensed, the sequence to be observed in mixing certain ingredients; incompatible ingredients, sometimes intentional; chemical reaction, how avoided in certain mixtures; suspending agents in mixtures containing heavy insoluble salts or resinous tinctures; finishing and wrapping.

(6) Emulsions: emulsifying agents, emulsification of special drugs and fixed and volatile oils and of balsams.

(7) Draughts and drops: how dispensed.

(8) Pills: to be dispensed as small as possible, characteristics of a properly prepared pill, excipients (hard, soft and liquid), special excipients, dusting powders, silvering, gelatine coating and varnishing pills.

(9) Powders: essential points in dispensing powders, powders containing volatile or deliquescent salts, and powders for lotions and injections, how dispensed.

(10) Aromatic waters; extemporaneous preparation of.

(11) Decoctions, infusions: the importance of their being freshly prepared.

(12) Suppositories, pessaries and bougies: the necessity of adding wax to certain official suppositories.

(13) Liniments and pigments: how dispensed.

(14) Plasters and blisters: plaster shapes.

(15) Ointments: guiding principles in making ointments.

(16) Departmental rules regarding the keeping of poisons, the dispensing of liniments and poisonous preparations.

The qualifying examination under the technical examination scheme consists of an oral and practical examination in the subjects prescribed in the syllabus above.

The Chemists and Druggists' course.—The course of study and instruction is as follows:—

Basic qualification.—Matriculation or Secondary School-Leaving Certificate Examination.

First year of study.—Botany, Inorganic Chemistry (theory), Materia Medica, Chemistry (practical), Practical Pharmacy, Practical Chemistry, Organic Chemistry (theory).

Second year of study.—Materia Medica.

Chemistry (practical) for three months.

Final Examination in Theoretical and Practical Chemistry, Materia Medica and Practical Pharmacy.

Apprenticeship—one year's attendance in a chemist and druggist's shop at any time after the first year of study.

It will be seen that this training imparts a fairly good knowledge of the principles and practice of pharmacy and a chemist and druggist so qualified can be relied upon to undertake the responsible duties of a pharmacist.

Bombay

193. *Qualifications for compounders.*—There are no regular rules regarding the qualification and training of compounders. Only candidates who have passed the VI Standard of an Anglo-Vernacular school are eligible for entrance.

The candidate is required to possess—

(1) An intimate and minute knowledge of the composition, strength and doses of all drugs and preparations of drugs supplied to civil hospitals and dispensaries.

(2) General knowledge of the rest of the British Pharmacopœia, specially doses.

(3) The ability to read prescriptions and to detect doses in excess of those laid down in the British Pharmacopœia. The candidate must be able to state readily how much of each of the drugs (or of the preparations of drugs), of which the prescription is composed, is in each dose of the mixture, pill, etc., as the case may be.

(4) A knowledge of the more elementary incompatibilities.

(5) Ability to compound drugs, correctly and neatly make pills, powders, ointments, spread plasters, etc.

(6) An elementary knowledge of the various antiseptics and dressings used in the surgical practice of dispensaries such as carbolic acid, boric acid, perchloride of mercury, iodine, etc., the strength in which each is usually used and the methods employed in making each up.

(7) A knowledge of what drugs supplied to dispensaries are poisonous and an elementary knowledge of the antidotes to be applied in case of poisoning by such drugs.

The United Provinces.

194. In the United Provinces, a scheme for the training of compounders has been started since January 1928, in six different centres of the province, namely, Allahabad, Benares, Lucknow, Agra, Meerut and Bareilly. The minimum educational qualification enjoined is a pass in the VIII Class of a recognized English school and the training to be undergone is for a period of ten months. The syllabus includes a knowledge of or acquaintance with the following items:—

(1) Weights and measures and their signs employed in prescriptions—Metric system.

(2) Compounding and dispensing.

Preparation and dispensing of pills, tablets, lozenges, pastilles, capsules, powders, suppositories, bougies, pessaries, pastes, ointments, plasters, jellies, mixtures, emulsions, applications.

(3) Incompatibles—with special reference to prescription making.

(4) Doses of drugs and preparations of British Pharmacopœia.

(5) Recognition of poisons—their doses, precaution in storing and dispensing them—Government regulations about cocaine, opium and alcohol.

(6) How prescriptions are written—prescription reading—abbreviations in use.

(7) Ordinary bazaar medicines—their doses and uses.

(8) Keeping of stock book, preparation of indents and method of storing drugs.

(9) Hospital accessories—their names and uses.

(10) Surgical instruments—their names, method of cleaning and preservation.

(11) Preparations of dressings and lotions.

(12) Bandaging—methods of applying various kinds of bandages.

(13) How to dress wounds and simple injuries.

(14) Arrangement and care of operation room—preparation for operations.

(15) Sterlization and asepsis—working of high pressure sterilizer.

(16) Elementary first aid—preparation and application of poultices, fomentations, blisters, enema, taking of temperature, pulse and respiration.

The Punjab

195. There is no regular system of training for compounders. Probationers are recruited from time to time who, after satisfying

the requirements given below, are promoted to the grade of compounders. Before recruitment, the candidate's knowledge of English and arithmetic is tested by the Civil Surgeon.

No examination as to the educational requirements is necessary in the case of a candidate who has passed the Middle School Examination.

A probationer is promoted to the status of a fifth grade compounder after satisfying the Civil Surgeon that—

(*a*) he has an accurate knowledge of weights and measures;

(*b*) he is able to compound neatly pills, infusions, decoctions, mixtures, etc.

(*c*) he has a fair knowledge of the appearance and the doses of the drugs, especially poisonous drugs, according to ages;

(*d*) he has a fair knowledge of dressing wounds and of bandaging.

A fifth grade compounder may qualify for the English qualification allowance on passing the following test:—

(*a*) Reading simple sentences of English prose.

(*b*) Transcribing simple printed sentences of English prose.

(*c*) Reading intelligently English prescriptions.

(*d*) Working exercises in arithmetic in addition, subtraction, multiplication and division.

The standard qualifying for promotion to the fourth grade is—

(*a*) a thorough knowledge of compounding in all its branches;

(*b*) an accurate knowledge of the appearance, doses and actions of drugs;

(*c*) a thorough knowledge of dressing wounds and bandaging.

With regard to a fourth grade compounder's knowledge of English, the test is—

(*a*) ability to read intelligently and explain sentences of easy English prose in the printed character,

(*b*) ability to copy neatly and correctly a piece of ordinary English from the written character;

(*c*) ability to read and write intelligently English prescriptions;

(*d*) a knowledge of arithmetic up to the rule of three.

To qualify for promotion to the third grade, the compounder must have a competent knowledge not only of all the professional subjects described above for the fourth grade compounders but must also be able—

(*e*) to administer enemas, to put up cases of simple fracture, extract teeth, and perform vaccination operations.

With regard to English qualifications, he must be able—

(*a*) to read fluently and intelligently a piece of ordinary English prose;

(*b*) to write from dictation with a reasonable amount of correctness;

(*c*) to read and write English prescriptions intelligently;

(*d*) to do sums in arithmetic up to, and inclusive of, the rule of three.

The standard qualifying for promotion to the second grade of compounders shall include a thorough knowledge of the following subjects over and above those already described:—

(*e*) ability to diagnose and treat cases of ordinary diseases that apply for relief at dispensaries;

(*f*) a knowledge of the composition of the pills, mixtures, powders, etc., of the British Pharmacopœia.

NAGPUR

196. *Compounders' course.*—Candidates for admission into the compounder class must not be under 17 years of age and must possess the following preliminary qualifications:—

(i) Ability to read and write fluently at least one vernacular language commonly spoken in these provinces.

(ii) Passing of an examination not lower than the annual examination in Class VIII of an Anglo-Vernacular Middle School of the Central Provinces Education Department or an equivalent examination of another Province.

The course of study extends over a period of one year. The candidates are required to attend a course of lectures for three months in materia medica and pharmacy and practical demonstration in museum.

Course of instruction—

(1) Practical pharmacy.

(2) Reading prescriptions and labels and writing them in English from dictation.

(3) Criticism of prescriptions as to dosage and incompatibles and the action to be taken when a prescription is not understood or is dangerous.

(4) The compounding, mixing, preparing and dispensing of drugs and the avoidance of waste.

(5) The preparation of antiseptic lotions and dressings.

(6) Bandaging, dressing of wounds, sterilizing of instruments, taking of temperature, training in first aid, etc.

(7) The preparation of returns, writing out registers and filing papers, etc.

BURMA

Compounders' course

197. *Minimum basic qualification.*—I. Primary school examination and examination in English and arithmetic by the Civil Surgeon or Medical Officer of the hospital at which it is proposed

to train them with a view to satisfy themselves that they possess the necessary knowledge of these subjects beyond those required of a candidate who has passed the primary school examination in order that they may be able to perform the duties required of a compounder efficiently. II. Anglo-Vernacular Middle School Examination.

Period of training.—One year in the Rangoon General Hospital and in a few of the larger hospitals of the province to be notified by the Inspector-General of Civil Hospitals.

A candidate for compoundership must pass in each of the following tests:—

(*a*) Ability to read English prescriptions and the signs for weights and measures.

(*b*) A practical knowledge of weights and measures and of the simple rules of pharmacy, such as the limit of weight for pills.

(*c*) Ability to compound accurately and neatly a simple prescription for pills, a mixture, and an ointment written in English, the quantities of each ingredient being indicated by English signs.

(*d*) A knowledge of the names and uses of the hospital necessaries in ordinary use in compounding.

(*e*) Ability to recognize such drugs as are in most frequent use and to state the usually prescribed dose of each with a knowledge as to which of them are poisons.

(*f*) A knowledge of the names and uses of such surgical instruments as those contained in a 'pocket case'; syringe catheters and the like.

(*g*) Ability to apply properly three or four of the bandages in most frequent use and to dress cleanly and neatly ulcers and simple wounds.

The candidate must also show an acquaintance with the composition of such medicines as are in most frequent use and ability to name the drugs in the stock usually supplied to a main dispensary which are classed as 'Poisons' together with their doses.

198. It does not require any great research to infer from the study of the above list that the advantages accruing from the promotion of pharmaceutical education have not yet been sufficiently appreciated in India. The basic education is, in many cases, disproportionately low. With the exception of a few provinces, the actual course of training is also generally inadequate. It is grossly insufficient to equip them to the proper discharge of the responsible duties which fall on them. The superior class of pharmaceutists is practically ignored. The profession does not attract pupils of status and education. The remuneration which they receive bears no proportion to the responsible character of their duties. The result is that the profession commands little or no prestige. If the needs of the country are to be adequately

met, a correct conception of the true character of the profession and of its nature, dignity and functions has to be brought home to the people in general. Public opinion must be so educated as to accord to the profession its proper place in the departments of human activities. It must be made impossible for persons without adequate training and qualifications to dabble with the profession. A system of training and education suited to the peculiar conditions of the country should be carefully devised so as to lift the profession out of the morass into which it is sinking deeper every day.

199. The necessity for desperate remedies is accentuated by a consideration of the state of the profession in other parts of the world. Pharmacy has attained a very high standard of development in most of the progressive countries. It is considered there to be an important branch of applied science. Systematic courses of training are imparted in colleges which are specially designed for the purpose known as ' Colleges of Pharmacy.' The subject forms a part of the curriculum of many Universities. The standard of education in some of the important countries of the West may be glanced at to gain a comparative idea of the training existing in India.

GREAT BRITAIN

200. There are two different courses of training for pharmacists —the Junior course, ' the Chemist and Druggist ' and the Senior course, ' the Pharmaceutical Chemist.'

A preliminary qualification of the standard of Junior Local Examination of Cambridge or Oxford or the Matriculation Examination of the University of London is required before admission to a pharmacist's course. After completion of a course of study at an approved institution of at least 440 hours in chemistry, botany and physics, the candidate will be allowed to sit for the preliminary scientific examination. He has then to serve an apprenticeship and show proof that he has served for at least 4,000 hours spread over not less than two years under a qualified pharmacist in a pharmacy, hospital, dispensary or other approved institution. In addition, he has to attend a systematic course of study of 720 hours in pharmacy, pharmaceutical chemistry, pharmacology and forensic pharmacy. He is then permitted to sit for his qualifying examination and on passing gets a ' chemist's and druggist's ' diploma.

Pharmaceutical Chemist's Examination.—After passing the preliminary scientific examination, the candidate is required to go through a period of training of at least 2,000 hours in a pharmacy or hospital. Attendance at an approved systematic course of at least 1,600 hours in botany, chemistry, pharmacology, pharmacy and forensic pharmacy is also enjoined.

Degrees in pharmaceutical chemistry are also conferred by Universities of London, Manchester, etc. These are recognized by the Pharmaceutical Society of Great Britain for purposes of registration.

Thus, it will be seen that the candidate for the course of pharmacy now has to undergo what is practically a two years' approved systematic course of training for the lower qualification and three years for the higher. University degrees are also open to him if he is a matriculate.

The United States of America

201. In the United States of America, there are no national or State laws to guide pharmaceutical education in a general way. There is a voluntary organization known as the 'American Association of Colleges of Pharmacy' which was established in 1900. This body is responsible for raising the standards of pharmaceutical education by voluntary co-operation with all the pharmacy schools, in the Federation.

A candidate for admission into a college of pharmacy is required to possess at least four years of high school work or its equivalent. The minimum course is of three years' duration, each year consisting of 32 weeks of college work with certain requirements as to credit hours and curricula. The minimum degree is Graduate in Pharmacy (Ph.G.), which is eligible for registration under most State laws. The degree of Pharmaceutical Chemist (Ph.C.) is given for a somewhat more advanced course and the degree of Bachelor of Science in Pharmacy (B.Sc. in Phar.) is annually conferred upon many students who take a longer and more difficult course. This degree is usually the minimum educational qualification for official, Governmental and State employment and for many positions in manufacturing establishments. Post-graduate courses leading to the degree of Master of Science in Pharmacy (M. Sc. in Phar.) and Doctor of Pharmacy (Phar. D.) are also available for those interested in research work or who intend to enter the profession of teaching. From 1932, no student will be accepted for a course of less than four years' duration. Thus by 1936 the minimum course in pharmacy recognized in the United States will be that leading to the degree of Bachelor of Science in Pharmacy.

Germany

202. The course of training for pharmacists in Germany is at present as follows: The future pharmacist having attained what we would call the 'higher leaving certificate' standard, works as an apprentice (praktikant) in the pharmacy for two years, during which time he must, in addition to gaining practical experience, make himself familiar with chemistry, physics and botany. Then comes the 'preliminary pharmaceutical examination' at the completion of which a year of apprenticeship will have to be served in an 'apotheke.' Then he goes through a University course which at present takes four semesters (six months), but is likely in the near future to be extended by two further sessions. Lectures are taken on general and pharmaceutical chemistry, physics, botany and pharmacognosy, pharmacology and bacteriology. Practical classes in analytical and pharmaceutical chemistry,

toxicology and methods of sterilization and microscopic examination of drugs have also to be attended. Then the Pharmaceutical State Examination is held; following which the candidate has to work for another two years in pharmacies until he receives his 'approbation.' This entitles him to the independent management of an 'apotheke.'

The course of training and examination is uniform all over Germany. There is no degree of Doctor of Pharmacy but many graduate as Doctor of Philosophy taking usually a further five or six semesters in pharmaceutical chemistry or botany or the natural sciences.

203. It is not necessary to refer in detail to the qualifications enjoined by the State in other countries. In almost all the countries in the Continent of Europe, Italy, Norway, France, Sweden, etc., dispensing is reserved exclusively to the qualified people and a very high standard of training is maintained. In Switzerland, almost all the Universities maintain a Chair in Pharmacy and a systematic course of training is given. In Russia also, a strict system of training has to be gone through before a pharmacist is recognized by the State and is allowed to practise as such. All pharmacies there are owned by the State and the pharmacists and their assistants are civil servants. Japan has already fairly advanced in pharmaceutical education and organization. In the far East, the Nanking Government has recently brought out a Chinese Pharmacopœia in one volume with definite standards to supersede the orthodox one in 52 volumes. The South American Republics and the Straits Settlements are also known to be pharmaceutically progressive.

Chapter VI

Methods of control

204. A close study of the conclusions arrived at in the previous chapters of this part irresistably points to the pressing need for immediate improvement of the situation in regard to the profession of pharmacy in India and to the manufacture, sale and import of drugs included in the British Pharmacopœia as well as of those which are 'known and approved.' As described by some of the witnesses, the situation is chaotic in the extreme and calls for stringent measures to cope with it urgently.

205. The propriety of limiting freedom, in the interests of the public at large, by subjecting it to necessary control cannot be gainsaid. The claim for special and exceptional measures for strict control over the so-called 'drugs of addiction' or habit-forming drugs as Indian hemp and opium has been recognized. The International Opium Convention signed or ratified by every civilized nation in the world is directed against such drugs. The maintenance of the purity and strength of other drugs is a justifiable ground for grant of special protection.

206. To the effective search of measures of control, a careful investigation of the true causes for the existing condition of things will assuredly be a useful and illuminating prelude. The absence of efficient powers of control, the lack of proper safeguards and the inadequacy and ineffectiveness of the existing laws stand out in bold relief in the forefront. The want of strong public opinion, the insufficient appreciation of the importance of the subject by all concerned, the general backwardness and illiteracy of the people and their lamentable dependence on foreign goods, have not a little contributed to the unsatisfactory character of the existing conditions. Of the latter, we shall give our views in Section IV. The precise state of the laws has been examined in Section II. In the words of Mr. M. N. Ghose, Chemical Examiner for Customs and Excise, Calcutta, the position may be succinctly summed up thus—

> The existing laws and the machinery for enforcing them are not adequate to deal with adulteration or other fraudulent practices, defective manufactures from carelessness or want of knowledge and too long storage whereby the efficacy of a drug is materially affected.

207. Adulteration is generally the outcome of unhealthy competition to supply medicine at low prices. Under-strength in preparations labelled as poison is common, partly on account of the paucity of qualified chemists capable of testing them and partly on account of the desire to avoid untoward accidents. Such is the case with preparations like tinctures of nux vomica, digitalis and the liquid extracts of ergot and belladonna. The devices adopted are many, namely, (1) removal of the characteristic principle from essential oils (e.g., eugenol from oil of cloves, cineol from eucalyptus oil, santalol from sandalwood oil, menthol from oil of peppermint); flavouring of the terpene and sesquiterpene residues with such substances as benzaldehyde, cinnamic aldehyde, terpeneol, geraniol, and sale as essential oils; and mixture with mineral oils; (2) adulteration of expensive drugs such as cocaine, santonin, saccharine, quinine, caffeine, potassium iodide and thymol, with substances similar in appearance, e.g., cocaine with phenazone, aspirin, potassium nitrate, etc., santonin with boric acid; quinine with chalk, starch and other inert matter; potassium iodide with potassium bromide which is much cheaper; (3) use of inferior or damaged raw materials which are purchased at cheap rates; (4) use of preservatives permitting decrease in alcohol content, e.g., addition of carbolic acid, formaldehyde, salicylic acid (which are injurious in character); (5) importation of time-expired or stale drugs which are not saleable in the country of origin; (6) false and misleading labels as to quality and strength; and (7) adoption of fictitious names with the object of misleading the public.

208. As regards the profession of pharmacy, there are practically no restrictive laws of general application except certain perfunctory provisions in Municipal Acts of some of the Provinces relating to the registration and licensing of retail shops and the employment of compounders.

209. Biological products and organo-metallic compounds require special care in their manufacture as regards personnel and equipment, and their subsequent control by bio-chemical and biological assays. Equally great attention is required in regard to their import as they are peculiarly susceptible to defective conditions of transit and storage.

210. That the danger attending the use of patent and proprietary medicines calls for intervention cannot be doubted.

211. Numerous suggestions have been offered by the witnesses in furtherance of the improvement of the situation. Though varied in details of secondary importance, they exhibit striking unanimity in respect of essentials. Immediate legislation and tightening up of the laws, conditionally or absolutely, is demanded by nearly all. Some of them would accord precedence to the preparation of an Indian Pharmacopœia and the passing of an Act for the prevention of adulteration of foodstuffs, while others would insist on regard being shown to the nascent chemical and pharmaceutical industries of the country. The necessity for definite standards and tests for proper methods of analysis and for trained men and machinery to carry them out is stressed by all. Pharmacy laws to enforce registration of manufacturers and retail vendors of medicines as well as of manufactories and places of retail sale and for the improvement of the qualifications of pharmacists and compounders, together with the establishment of institutions for their training, are strenuously demanded by almost every witness. Provisions prohibiting adulteration and misbranding on the lines of the Acts in force in the United States of America and England are generally recommended for acceptance. Checks on imports and manufacture are stressed by many. That there should be a central controlling authority and laboratory with provincial branches and ramifications linked with it, is among the most popular of the proposals. The appointment of qualified, responsible and well-paid inspectors, to inspect manufactories and places of sale and to pick up samples for analysis, and of public analysts, to examine specimens submitted to them, finds general favour. Cold storage and special protection for biological and organo-metallic products and rigid control over labelling, the importation and sale of patent and proprietary medicines and the issue of advertisements commending them to the public, are almost universally advocated. These are some of the main proposals. We are impressed with the imperative necessity of adopting a comprehensive policy and have examined every proposal with the greatest care, with special regard to its practicability. We would formulate the following scheme as the most feasible one.

Drugs

212. The control should be confined to such drugs as are included in the British Pharmacopœia and other medicines of well-known therapeutic value. It is not feasible at this stage to impose

or enforce, similar control over the other classes of indigenous medicines, although it is eminently desirable to have some sort of check as indicated in Chapter III of this Section. Evidence is almost uniform that the control over pharmacopœial and 'known and approved' medicines should be central and should not be mixed up with that for foods, as the latter has to be adjusted to suit the peculiar requirements and conditions of the respective provinces. As observed by the Bombay Medical Union, in view of the peculiar conditions of India and of the fact that the assay and analysis of drugs, chemicals and therapeutic substances would require a specialized study, the Pure Drugs Act would need to be an all-India Act, while the Pure Foods Act can be passed by the Provincial Councils. A few witnesses like Doctor MacMahon of the United Provinces, no doubt, consider it neither desirable nor practicable to dissociate drugs from foods for purposes of legislation on the ground that it is very often impossible to say under what category a product or substance may fall. The Bombay Medical Union have also suggested that proprietary foods designed for infants and invalids and utilized medicinally should be brought under the purview of the Drugs Act. But, it does not appear that any insuperable difficulty will be experienced in actual practice in differentiating foods from drugs, or in bringing what are essentially drugs within the control of the Drugs Act.

213. That the central control should be only of a supervising and regulating character has not also given rise to any difference of opinion. Mr. Nivogi of the Bombay Customs Department has shown that the various Provincial Governments should be empowered to take action in respect of the requirements of their Provinces. Mr. M. N. Ghose of the Customs and Excise Department of Calcutta is for empowering the Local Governments to make rules for enforcing the provisions of the Act of the Central legislature in regard to their respective Provinces.

214. Doctor Sahni and Colonel Bakhle of Lahore suggest the establishment of a Pharmaceutical Society as the central controlling authority. Messrs. Beli Ram & Brothers also say that a Pharmaceutical Society should take the control of drugs and medicines in their hand. Lieutenant-Colonel Cook of Bhagalpur and the Civil Surgeon of Monghyr would want the guiding influence of the All-India General Medical Council. The latter prefers an all-India controlling authority as tending to efficiency and economy and as being less open to local prejudices and influences. Doctor Bindra of Rawalpindi and Doctor Das of Nagpur suggest a central body consisting of experts. Doctor Lakshmanaswami Mudaliar of Madras refers to the necessity of provincial boards of control in the different provinces and a central board working under the Government of India. Lieutenant-Colonel Pandalai of Madras expressly imposes the duty of locating well-equipped laboratories for drug analysis and research on the Government of India. Doctor Frank Noronha of Bangalore is emphatic that the

Central Government should give lead in the matter. Doctor MacMahon and the Indian Merchants' Chamber of Commerce are for *an All-India Council on the Western lines.*

215. In view of the above state of evidence, we incline in favour of central control vesting with the Governor-General in Council. The control would be exercised by the Department of Education, Health and Lands. The Governor-General in Council should be assisted by an Advisory Board and a Central Laboratory. A Pharmaceutical Council would be the legitimate authority for being entrusted with the enforcement of laws in relation to the profession of pharmacy.

216. The Advisory Board would have onerous duties to perform and should be an efficient body, above reproach or criticism of any kind. Some of the witnesses have given details as to its constitution which give an idea as to the nature of the body which they have in view. Mr. M. N. Ghose suggests that it should consist of eminent physicians, kavirajs and pharmacists. The Central Board and the Provincial Board spoken of by Doctor Lakshmanaswami Mudaliar, which to a certain extent correspond to the Advisory Board, should consist of the Chemical Examiner to the Government, a Professor of Pharmacology, a Professor of Therapeutics, the officer in charge of the Government Medical Stores Depot and a representative of the Pharmaceutical Society. Others generally say that it should be an expert body of chemists, doctors and scientists consisting of representatives of the Central Laboratory, private practitioners, firms of reputed druggists and the Government. That there should be a non-official majority or that it should be composed wholly or mostly of Indians are some of the other recommendations. Having given our best consideration to its constitution, our view is that it should consist of fifteen members. The Director-General of Indian Medical Service should be its Chairman, and the Public Health Commissioner to the Government of India, and the Director and one other member of the staff of the Central Laboratory should be ex-officio members. The remaining eleven should be elected by the General Medical Council in India, the General Council of Pharmacy, the Medical Faculties of Statutory Universities and independent medical practitioners. It is necessary to remember that in the desire for fuller representation or for excessive strength it should not become unwieldy. The elected members should be honorary and hold office for three years.

217. The establishment of a Central Laboratory and Provincial laboratories working under its guidance and in co-ordination with each other is one of the main planks of every proposal which the Committee had to consider. There is also a general agreement about their prestige and functions. As regards the central laboratory, the following remarks of the Chemical Examiner for Salt and Customs, Bombay, about existing laboratories, are pertinent:—

The Government of India do not have a central laboratory for all Government of India chemical work for civil departments similar to the

Government laboratory of London. The Government of India have separate chemical organizations, developed gradually through different periods of existence and quite distinct from each other in the nature of the work done. For example, the Agricultural, the Indian Stores, the Customs, etc., departments, have each got separate laboratories. It is eminently desirable that, to have a uniform standard of materials and practice, drug control should be a central subject and there should be a central laboratory for the execution of routine and research work.

With reference to its constitution, he says:—

that it should be such as to enjoy the fullest confidence of the general and the drug-manufacturing public, and that an independent existence is best calculated for the growth of that reputation.

218. The question whether any of the existing laboratories may be expanded so as to suit the requirements of the proposed Central laboratory has been examined in great detail in the memorandum submitted by Mr. T. S. T. Chari, Chemical Examiner for Customs, Madras. He is in favour of a central laboratory to correlate the working of existing laboratories which should continue with necessary modifications. So also is Mr. Niyogi of the Customs Department, Bombay. A contrary note is struck by Mr. M. N. Ghose, Officiating Chemical Examiner for Customs and Excise, Calcutta, who recommends the strengthening of the existing test stations (public health laboratory and customs laboratory) for foods and drug analysis at the disposal of the Government. The Superintendent of the Government Test House at Calcutta also brought to the notice of the Committee that the establishment there has a staff of experienced analytical chemists and has, for several years, been utilized by the Medical Stores Depot for the analysis of a considerable number of drugs and chemicals and suggested that the advantageous position of his establishment for undertaking the work should not be overlooked in case the necessity for centralized analysis arose and a Government Test House was ultimately agreed upon. With a view to see if the existing test house could be so developed as to meet the requirements of the contemplated central laboratory, the Committee availed itself of the invitation of the Superintendent of the Test house and paid a visit to it. We are not satisfied that the existing staff and laboratory are suitable for the object in view. The space available at the site is not large enough for the erection of additional buildings or to afford facilities for future expansion. Mr. Stewart, Collector of Customs, Bombay, took exception to a central laboratory on the ground that it could not be conveniently made use of for testing imported articles for customs purposes as the work could not be got done with the same degree of expedition. We are convinced that a separate and independent central laboratory, established and controlled by the Governor-General in Council, is essential in view of the highly specialized and technical nature, the superiority in standard and of the far-reaching importance of the work that is to be entrusted to it.

219. The staff and the functions of the Central Laboratory have been minutely examined in the memoranda of Mr. Chari, Mr. Niyogi, Mr. Rakshit, Doctor Dikshit and the Bombay Medical

Union. We are in entire agreement with their views. We may briefly summarize its functions. The Central Laboratory must do research work on the pharmacological testing of drugs, train Public Analysts in the method of chemical, bio-chemical and biological assay, undertake commercial testing of drugs for manufacturers and dealers on payment of the prescribed fee, assay and test chemicals, drugs, biological products and organo-metallic compounds and articles sent by Local Governments, Provincial Laboratories or Inspectors, prepare and maintain suitable standards of strength, purity and quality for drugs, standardize different methods of analysis and testing of drugs with due regard to the climatic and other conditions prevailing in different parts of India, guide, co-ordinate and correlate the work of the Provincial Laboratories, act as expert referee in respect of disputed analysis of samples sent by Local Governments, periodically issue bulletins about the progress in various branches of its activities and supply information to manufacturers and Provincial Laboratories as they may be in need of. The procedure which governs the relations of the Customs Control Laboratory at Lahore with the Customs Laboratories at Calcutta, Bombay, Karachi, Rangoon and Madras may, with necessary alterations, be adopted for regulating the relationship of the proposed Central Laboratory and Provincial Laboratories. It is said that when anything interesting from the Customs point of view comes to the knowledge of any of the laboratories the information is promptly communicated to the Central Laboratory which examines it and communicates its conclusions to the branch laboratories for information and guidance. The staff should obviously consist of experts in the subjects dealt with in the different departments of the laboratory. Doctor Sahni and Colonel Bakhle, our co-opted colleagues of Lahore, state that the officers in charge should be recruited for their special qualifications and in no case should this important work, on which the fate of the future drug industry of India largely depends, be entrusted to Chemical Analysers of Government simply because they are in Government service and have certain laboratory facilities. The Bombay Medical Union observed that the laboratories should be in charge of experts in chemical analysis as well as in biochemical methods of testing of drugs and that they should be recruited for their specific qualifications and not drafted, in accordance with the hitherto pernicious system of Government, from the Indian Medical Service. To our mind, the only determining factor in the choice of the personnel of the staff should be absolute competency and fitness and no other consideration should be permitted to influence the selection.

220. It is not for us to give elaborate details of the staff. We would, however, suggest that it should consist of two departments, (1) Pharmacology and Bio-Chemistry, and (2) Chemistry and Pharmacy. A Director should be at the head, and each of the departments should consist of one Deputy Director, one Assistant Director and two Senior Assistants. There should also be an adequate number of Pharmacologists. Bio-Chemists, Chemists and

Pharmacists, with the necessary clerical and menial staff. As regards the qualifications of the Director, we agree with Mr. Chari of Madras Customs that in order that the functions of the institute may be achieved it must be in the hands of a Director who is a first class live Pharmacologist with a sound knowledge of chemistry and he must have excellent research experience, a good business acumen and proved ability to initiate lines of research in the different laboratories and control the same, and sound experience of the drug trade. As regards its location, he says that, to derive the maximum benefit of such an institute, it must be situated in or near one of the bigger business centres like Bombay or Calcutta as it will get considerable inspiration for work from being in the midst of big manufacturing and importing chemists and druggists, public and private laboratories and hospitals. He would prefer its location either in the School of Tropical Medicine and Hygiene, Calcutta, or the Haffkine Institute, Bombay, as the necessary facilities by way of staff and equipment already exist there and suitable additional facilities by way of extension of buildings, staff and equipment may be easily provided to cope with any additional work. The amount of research work that is being done in these institutions under expert guidance and control is expected by him to act as an incentive and to accelerate the future work of the drug institute. Doctor D'Monte and the Bombay Medical Union suggest that it should be located in or near Bombay as it is the principal centre of import of drugs. Doctor Sahni and Colonel Bakhle merely say that it should be located in the principal centre of import. Doctor P. C. Chattopadhyay is in favour of Calcutta. As regards the exact place of location, we do not desire to say anything. There is not much to choose between Bombay and Calcutta.

221. The establishment and maintenance of an up-to-date laboratory in each of the several Provinces by the Local Governments concerned is alike supported by the witnesses examined. Its function should be to deal with drugs and chemicals of local manufacture as well as of foreign origin which come into the Province. It should report on the samples of drugs imported or made locally which are submitted to it for analysis and undertake, on payment, analysis of drugs at the request of manufacturers or others interested in obtaining its opinion. Many of the witnesses have suggested that research should form part of the functions of the Provincial Laboratory. We feel that it will be fully occupied with the legitimate work of testing samples submitted for analysis by Inspectors, etc., which will leave little time for carrying on research work. In the apportionment of the functions of the Central and the Provincial laboratories, it is eminently desirable that no overlapping should occur.

222. The question, whether the existing laboratories would answer the purpose, again arises for solution and practically the same considerations apply. Doctor MacMahon is of opinion that as the various Provinces already have their own Food and Drugs

Acts, the actual testing of drugs sold in the market should be left to the Provincial Public Analysts. He would recommend a staff of one Public Analyst, one Deputy Public Analyst, two Assistant Public Analysts and four Analytical Assistants to carry on the combined work of analysing foodstuffs and testing drugs and medicinal preparations. The present staff is said to be one Public Analyst (half time), one Deputy Public Analyst, one Assistant Public Analyst and three Analytical Assistants. We are not aware of the extent and magnitude of the work involved in testing foodstuffs. It does not seem objectionable on principle to combine testing of food and testing of drugs within the scope of one department provided it can satisfactorily cope with the double work. What we are concerned with is that it should be under the control and direction of the Central Laboratory in regard to the testing of drugs and should be adequately staffed and equipped to serve the purpose in view. It may be the existing Public Analysts' laboratory expanded in the manner mentioned by Doctor MacMahon or it may be a thoroughly new one which may also be utilized by the authorities to do testing work in connexion with foods. There should at least be a Public Analyst and a Deputy, expressly devoted to the work of testing drugs.

223. The provisions for control include the appointment of Inspectors. In this connexion, the Committee has had to consider the proper sources of recruitment. The Excise Department, the Medical Department and the Health Department were prominently mentioned. Suggestion was also made for direct appointments. As the evidence was insufficient to enable the Committee to arrive at a decisive conclusion on this point, we got into touch with the heads of the different departments concerned and ascertained their views. Their opinions are conflicting and are set out in Appendix K of Part II. In the interest of satisfactory discharge of duties, the Committee would prefer the appointment of special drug inspectors not attached to any particular department and who consequently have no other occupations. The Inspectors should be appointed by Local Governments subject to prescribed rules. These Inspectors may be attached to the Provincial Laboratories and not to any of the existing departments which are all apparently already overworked. Such an arrangement will make for expedition and efficiency in the execution of the work by the Inspectors. It is for the Local Government in each case to decide which department should be made responsible for the work and to adopt the most feasible course. In the major Provinces, there should be at least a staff of two Inspectors and four clerks with the necessary menial staff, who should be exclusively devoted to the task of carrying out the proposed duties. In the other Provinces, the number may be halved.

224. If, however, it is not found feasible to have a separate staff of special inspectors as indicated by us we would suggest that they should be attached to the Health Department of each

Province and be made to work under their direct control and supervision. This is in accordance with what we gather is the general trend of the view of those who can speak with knowledge and experience on the point.

225. There is a consensus of opinion that the actual control should be exercised on the lines of those contained in the Sale of Food and Drugs Act of England and of the United States of America. Prominent reference may be made in this connexion to the evidence of Doctor MacMahon, Doctor D'Monte, Captain De of the Tropical School of Medicine and Hygiene and the memorandum of the Bombay Medical Union. The essential prerequisite is a clear exposition of the terms 'Adulteration' and 'Misbranding.' Doctor Mazumdar, Chief Health Officer of the Calcutta Corporation, has pointed out in his memorandum that the provisions of the existing Calcutta Municipal Act are based on the existing laws of Great Britain, United States of America, Victoria, New Zealand and New South Wales. Reference to Section II will show that many of the provisions of the Statutes in those countries have been incorporated in the Calcutta Municipal Act, 1923, with necessary modifications. We are of opinion that the provisions of that Act regarding 'Adulteration' and 'Misbranding' of drugs are sound and may be applied to the whole of India. Drugs should be deemed to be adulterated or misbranded in accordance with the definitions in clauses (2) and (42) of section 3 of that Act *. The British, German and American Pharmacopœias may be recognized. The Governor-General in Council, in consultation with the Advisory Board, may be empowered to specify one or more particular pharmacopœias to which the drugs should conform. In cases where no pharmacopœias are mentioned and where the composition is not stated on the label, the drugs should be required to conform to a recognized standard as laid down for the purpose. The sale, manufacture or storage for sale of adulterated or misbranded or unwholesome drugs should be prohibited as in sections 406 and 412 of the Calcutta Municipal Act. The prohibition should also be extended to notified drugs or those having similar names, as in section 407. Proof of purchase under a *bona fide* warranty and sale in the same condition as it was purchased should be recognized as a good defence if pleaded promptly as in section 136 (*c*) of the Rangoon Municipal Act.

226. Every manufacturer or retail dealer or importer of drugs and medicines should be required to take out an annual licence as prescribed. Subject to certain exceptions every place for the manufacture or retail sale of drugs and medicines should be registered as prescribed. The display of the licence and certificate of registration in a conspicuous part of the premises should be made obligatory. This will be a safeguard to the public who will at once be able to find out whether the shop is registered or not and whether it is one to which they could safely resort.

* See the provisions quoted in Section II.

227. The expression 'drugs and medicines' is elastic and comprehensive. For purposes of law, it would comprise all medicines, official and non-official. Among these are many articles of general household use which are in themselves harmless, such as salt, soda, glycerine, olive oil, castor oil, honey, syrup and articles of similar nature. To totally forbid the practice of pharmacy without registration and licence, would impose the obligation of registration and licensing of every shop or place, the business of which includes that of selling such drugs and medicines. In other words, it would tend to grant to the licensed pharmacist a monopoly of the sale of many useful and harmless substances. Such a limitation on the sale of harmless drugs does not operate to promote public health or weal. It would, on the other hand, cause untold inconvenience and misery to the people at large and to the poor in particular. It is, therefore, necessary to exercise some discrimination in this matter and to exclude places for the sale of simple, useful, non-poisonous and domestic remedies from the operation of the rule requiring registration and licensing. Such drug stores are in other countries exempted from the requirement of registration. It is difficult to define with meticulous accuracy what such remedies are. The proper course would seem to be to leave them undefined, to be specified by regulations made by the Governor-General in Council. Places for the sale of drugs and chemicals in the ordinary course of wholesale dealing or in unbroken packages do not call for the exercise of any special vigilance or care and may also be excluded from the purview of the rule. To guard against the possible misuse of this privilege and to subject such vendors to some measure of disciplinary control it is desirable to provide for an annual permit in respect of such persons and places.

228. Provisions for inspection and seizure of drugs and for their destruction or for taking them before a magistrate, similar to those in sections 418 and 421 of the Calcutta Municipal Act, 1923, should be made. There should also be provisions for the compulsory purchase of drugs for analysis on the lines of section 424 of that Act. Any person in possession of a drug should be entitled to get it analysed on payment of the prescribed fee. In case the certificate of a Public Analyst is called into question by either party, the court before which the proceedings take place may, of its own motion or at the request of either party if it thinks fit, refer a sample to the Central Laboratory in the prescribed manner. The breach of any of the proposed provisions or any act in contravention thereof or of the rules or conditions imposed by licences, etc., should be made an offence. The punishments may consist of imprisonment, fine, confiscation and revocation or suspension of licences and should be deterrent. Complaints have been insistent from those entrusted with the duty of enforcing the existing Prevention of Adulteration Acts against the inadequacy of their provisions in regard to punishments. In fact, many ascribe their ineffectiveness to this vital drawback.

Second and subsequent offences should be treated with progressive severity and conduct involving deliberation and intention should be put down with a strong hand.

Imported drugs

229. A large quantity of drugs and chemicals sold in India have a foreign source and are brought into the country by import. The safeguarding of their purity and potency is as essential as in the case of manufactured articles. There is either no legislation in foreign countries in respect of exports, or such legislation as exists there is not efficient enough to exclude adulterated or sub-standard articles from the importing countries. The Food and Drugs (Adulteration) Act, 1928, in force in the United Kingdom which contributes a large share of the imports does not deal with exports at all. Regulation No. 21 made under the Therapeutic Substances Act, 1925, authorizes the dispensation of the severe restrictions imposed by the regulations if the substance is manufactured for use exclusively outside Great Britain and Northern Ireland and says that such dispensation is desirable regard being had to the nature of any arrangements for regulating the manufacture and sale of the substance in operation in the country to which the substance is to be exported. In the utter absence of any restrictive arrangements in India, it may be that the regulations are seldom dispensed with and to this circumstance may possibly be ascribed the fairly satisfactory condition of therapeutic substances received by import. The Federal Food and Drugs Act of the United States of America does not impose any effective check on exports. Section 2 and the regulations under it provide that no article shall be deemed to be misbranded or adulterated when intended for export to any foreign country if it is prepared or packed according to the specifications or directions of the foreign purchaser and no substance is used in the preparation or packing thereof in conflict with the laws of the foreign country to which it is intended to be shipped. To the same effect are the laws in most of the other foreign countries. The result is that the laws of the exporting country will offer no protection against adulteration or misbranding unless the importing country helps itself by home-laws of its own. Hence, the necessity for imposing restraints on imports follows as a matter of course, even though laws safeguarding against adulteration, etc., in the country of origin deal with exports indirectly. We have gone into this aspect of the question at some length as the evidence of some of the witnesses proceeds on the mistaken view that the Federal Foods Act and similar Acts prohibit the export of articles which are not saleable in the country of origin.

230. The suggestions as to the methods of control are many. Mr. Mawnay of Messrs. R. D. Mawnay and Company, Madras, would say that orders should be placed only on such foreign firms as are recognized by the Government of India and, with the view of enforcing responsibility for the goods shipped, would further

restrict the choice to those firms who have accredited agents or representatives in such important centres as Bombay, Calcutta, Madras and Rangoon who shall be answerable on behalf of their exporting firms for any cheating or fraud committed by them. The Civil Surgeon of East Khandesh is for confining imports to those sent out by reputed firms. The difficulty of getting at the exporter has exercised the mind of many a witness although the possibility that the dealers in India, greedy of more profit, may expressly indent and obtain inferior stuff, with B.P. label affixed to the packages, at less cost and put them for sale at a higher price has not escaped the notice of some like Doctor U. Rama Rao of Madras. Messrs. B. K. Paul & Co. are for approaching the countries of export for enforcing their Food and Drugs Acts against all exportable products which do not now fall within their purview. Doctor Mukerjee of Patna, Doctor Das of Nagpur and the Bombay Medical Union insist that the articles should be accompanied with certificates or declarations showing that they are of proper standards and are saleable in the country of origin and containing particulars as to the dates of manufacture and arrival in India and the period of potency. There is also evidence to the effect that all the imported articles should be tested at the place of manufacture and at the port of entry and that all the importers should be licensed. The Bombay Medical Union think that with labels containing proper declarations, it is enough if Customs authorities at the ports of entry are given power to exclude or confiscate such drugs as are adulterated, or misbranded or deleterious or which are found on assaying to be sub-standard.

231. We are of the opinion that all the importers should be licensed and that check at the port of entry may be exercised on the lines of the Federal Food and Drugs Act. Every imported article need not necessarily be tested. Samples may be selected and got analysed by Inspectors, as in the case of manufactured drugs. But, in relation to imported articles at the port of entry, such officer of Customs as may be generally or specially authorized thereto by the Commissioner of Customs and Excise, will be the inspector. As observed by Mr. Chari, the Customs laboratories will be very useful and valuable units in any scheme for the control of potency and purity of drugs. The Customs Chemist assisted by the Medicine Appraiser will be able to lay his hands easily on imported drugs of a spurious nature. If he has reasons to suspect any drug, he will report the matter to the Collector of Customs who can send the sample to the Public Analyst. The analysis should be by the Public Analyst at the Provincial Laboratory. This may, in certain cases, lead to duplication of work and delay as spoken to by Mr. Stewart, but on the whole such a course would tend to uniformity in practice and would seem to be the most satisfactory arrangement. In the case of biological products and organo-metallic compounds, a departure from this practice should, of course, be made as indicated below. The consignment may, pending analysis, be detained or delivered to the consignee on such conditions as may be prescribed. If on analysis the article is found adulterated or misbranded, such article and others of the same kind

may be treated as having ' false trade description ' applied to them within the meaning of the Merchandise Marks Act, 1889, and the Sea Customs Act, 1878, and they may be confiscated or prohibited entry and disposed of according to the prescribed manner. If any drug is sold in a sealed original package which is adulterated or misbranded, the person whose name appears from the label thereof to have manufactured, imported or enclosed it in such package will ordinarily be held responsible and punished accordingly, unless he shows that it was beyond his control and was due to deterioration or other change in the article since it left his possession. As regards the contents and requirements of labels affixed to imported articles, we consider it best to leave them to be prescribed by regulations made by the Governor-General in Council in consultation with the Advisory Board.

232. In view of the existence of foreign territories and Indian States in close proximity to the Provinces, it would be necessary to provide for the control of drugs and chemists coming into British India through the borders. The attention of the Committee to this aspect of the question has been drawn by the Bombay Medical Union. The provisions as regards licence, inspection, sampling and analysis regarding imports by sea, may be made to apply *mutatis mutandis* to such articles also. In respect of such articles imported by land, the ' Inspector ' may be such officer as may be authorized by the Collector of Land Customs as defined in the Land Customs Act, 1924. Adulterated or misbranded articles can be treated as those bearing false trade description or misdescription within the meaning of the Indian Merchandise Marks Act, 1889, and the Bombay Land Customs Act, 1857. On this basis, the person responsible for the fraud may be convicted and the goods may be forfeited or confiscated. Arrangements for inspection, etc., analogous to Customs examination at the borders, may be conveniently adopted.

Exported drugs

233. The demand for control was not confined to imports only. Doctor Phani Bhushan Mukerjee of Patna stated: " The legislation should in my opinion affect equally drugs manufactured in India for export abroad. I stand for absolute stoppage of manufacture of any drug or chemical, either in India or abroad, by legislative means which would be a menace to public health in any country by virtue of its being adulterated, under-strength or of inferior quality. Patients and suffering humanity are a sacred trust in the hands of the medical profession and since physicians do not prepare the medicines they prescribe with their own hands all attempts at exploiting the suffering public by introducing drugs into the market, which would not produce the results which they are expected to, should be put down with an iron-hand." The Bombay Medical Union also pointed out " that the pure Drugs Act in India should have reference not only to the purity of drugs imported into the country, but also of drugs, etc., which may be exported from India in the same way as is done in the case of exports of drugs, etc., under the Pure Food and Drugs Act of the United States of America."

234. We have already shown that the Federal Food and Drugs Act does not exercise any effective control over exports. Impressed though we are with the morality of the appeal for thoroughness of reform in all directions, we cannot help regarding it as an ideal which must be approached gradually and cautiously. We feel that it will be too drastic and revolutionary to impose any restrictions on exports at this stage. Further, the importing countries may well be left to take care of themselves.

Biological products and organo-metallic compounds

235. Biological products and organo-metallic compounds require special protection. The Bombay Medical Union have suggested, and we entirely agree with them, that control on the lines enacted in such countries as Great Britain or the United States of America is not only desirable but essential. We consider that the substances included in the Therapeutic Substances Act of England and such other substances as may be prescribed may be brought under control. The manufacturer, importer and the seller as well as the place of manufacture or sale should be licensed. The conditions and form of the licence should be as prescribed. Rules should regulate the adequacy of staff, premises, plant and appliances and the requirements as to storage, containers, and labelling. They should prohibit the sale of the product after the expiration of the prescribed period from the date of the manufacture. The standards of strength, quality and purity should be formulated and prescribed as well as the tests to be used for determining whether such standards have been attained. The testing should in every case be in the Central Laboratory. Periodical testing should be prescribed and the licensee should, from time to time, on request, furnish to the Central Laboratory, from such batch of the substance as the Central Laboratory may specify, a sample of such amount as may be considered adequate for the required examination. Articles should not be imported which do not comply with prescribed standards of quality, strength and purity. Sale or being in possession for sale of any article, knowing it to have been manufactured or imported in contravention of the provisions of the Act or of the rules or of the conditions of the licence, should be made an offence. Samples of each lot of manufactured or imported products should be sent to the Central Laboratory for testing and, in the case of the latter, shipments should not be delivered to the consignee until the tests are made and certificates and licences are issued permitting delivery.

Chapter VII

Methods of Control—cont.

The profession of Pharmacy

236. Enough has been said in Chapter V to show how utterly unregulated and disorganized the profession of pharmacy is at present in India. The lack of adequate educational qualifications for the compounders, the failure to bring home to the public at

large a proper realization of the dignity and importance of the profession and the absence of restrictive laws to control it, are alleged to lie at the root of the evil. Many of the witnesses have given constructive suggestions for rescuing the profession from its degeneracy. Most of them agree in what may be regarded as the fundamental essentials of the scheme for its betterment.

237. Although the majority of the witnesses are agreed on the need for thoroughly overhauling the present system of training, the exact lines on which it should proceed has given rise to some differences of opinion. The shortness of the period of training is, according to some, the feature which requires reform. Doctor Hari Singh Bisht of Agra is in favour of a period of two years and our co-opted colleagues of Lahore would insist that the training course should extend for over a period of one year, or eighteen months. The latter also consider that the minimum qualification required for admission to the class should be Matriculation or an equivalent test. Others take exception to the method of training which aims at turning out both compounders and dressers. Major Amir Chand, I.M.S., of Amritsar advocates an independent course entirely free from the surgical training. The necessity for uniformity of standard all over India is stressed by another group of witnesses. Doctor C. P. Chaube of Delhi stated that the examination papers must be the same all over India.

238. A higher grade of training which is calculated to turn out men of much superior type forms another recommendation. Doctor Braganza of the Poona Drug Stores would discard the designation of ' Compounder ' and prefer that of a ' Pharmacist ' or ' Licentiate in Pharmacy ' for those receiving the higher grade of training. Such a grade of training would lead to the creation of a type of people corresponding essentially to the chemists and druggists' class existing in Great Britain. The standard of education would be the Matriculation Examination of the Indian Universities or an equivalent test, followed at least by a two years' course in a medical school or college, more or less on the lines of that obtaining at present in the Madras Medical College. Persons with such qualifications, it is said, would be eligible for starting independent pharmacies and chemists' shops and could be relied upon to discharge the responsible duties attached to the profession of pharmacy. The need for the encouragement of this class of people is emphasized by Doctor Lakshmanaswami Mudaliar of Madras, who suggests the appointment of such persons in all large hospitals in the city and in the district headquarter hospitals.

239. A still higher grade of qualification is demanded by some. They recommend the institution of Science degrees in the Universities with Pharmaceutical Chemistry as the main subject. It is said that the class of people possessing such training would be competent to take up manufacture of drugs and chemicals and to carry on the analysis and assay of drugs. The Conference of the Delegates of the Medical Faculties of the Indian Universities convened by the Bombay University seems to have already taken

steps in this direction and passed a resolution to the following effect, namely:—"This Conference recommends that, with a view to encouraging the manufacture of drugs and other medical specialities on a scientific basis in India, arrangements should be made by the Indian Universities to start a course in Pharmaceutical Chemistry and to institute a special degree and diploma in the same subject." The Indian Medical Association and Captain P. De of the School of Tropical Medicine and Hygiene, Calcutta, share the view and the latter points out how the profession of drug industry will in the future be a new avenue for advancement open to the educated young men of the country. The Bombay Medical Union observed that "without such well-trained personnel, as pharmaceutical chemists and pharmacists, it would not be possible to utilize the enormous raw material that exists in India for the manufacture of drugs and which is at present exported abroad and brought back into India in the form of manufactured drugs at high cost." According to the Union, the course should be a post-graduate one which should be open to those graduates who have taken their degrees in Chemistry and Botany.

240. The provision of suitable facilities for imparting education is naturally bound up with the question of the improvement of the standard of education and is, in fact, a condition precedent for effectuating it. At present, the training centres for compounders, except in a few isolated instances, are not well equipped and cannot possibly undertake the training of the superior grade of pharmacists. The arrangements for the teaching of practical dispensing are equally defective, as the students are left to pick up whatever they can under the guidance of dispensers who cannot themselves pretend to any high degree of proficiency. The establishment of a separate College of Pharmacy manned by experts is advocated by some, on the ground that the science of pharmacy has become an almost distinct branch and medical men without special training cannot ordinarily be expected to handle it properly. Doctor Nanavatty, Officiating Chief Medical Officer, Baroda, drew prominent attention to another aspect intimately connected with the profession which the starting of such colleges would facilitate, namely, the encouragement of research calculated to render the utilization of the raw products of the country a fair possibility. The Bombay Medical Union is no less strong in their demand and would want such a college with a research department in every provincial city or in as many of them as possible. Doctor Hari Singh Bisht of Agra steered a middle course by saying that an immediate beginning should be made by taking advantage of the existing medical schools and colleges wherein training can be imparted by a special staff of teachers although the ultimate establishment of a College of Pharmacy should not be lost sight of.

241. The mere improvement in the standard of training and qualifications of the pharmacists will be ineffective in the absence of restrictive laws controlling the exercise of the profession. If the properly qualified pharmacist is not protected from unqualified

charlatans, it is feared none will care to enter the profession seriously and face the unfair competition. Doctor Venkatarama Ayyar of Karur voiced this feeling thus: "Since the profession of pharmacy is not restricted to qualified persons, there is very unhealthy competition among these so-called chemists' shops and honest dispensing is rare, except in one or two shops in the metropolitan towns." Doctor K. S. Mhaskar of the Department of Pharmacology, Haffkine Institute, Bombay, and Doctor A. C. Sen of Delhi, among others, have demanded a Pharmacy Act to keep the manufacture and sale of drugs as well as dispensing in the hands of qualified and registered persons. The Bombay Medical Union, the Sind Medical Union, the Indian Medical Association and other influential and representative bodies are also in favour of the proposal. It is noteworthy that even pharmacists, who are likely to be most affected by the imposition of any restraints, have joined in the claim for legislative interference to ameliorate their conditions. The Chemists and Druggists' Association and the Pharmaceutical Society of India may be mentioned in this connexion. Dispensing chemists, who not infrequently employ unqualified men under them, have not also lagged behind, in pressing the necessity for laws to control the exercise of the profession. Out of 62 replies received in response to the questionnaires issued to chemists and druggists, 56 were emphatically in favour of such restrictions.

242. We are satisfied that the profession of pharmacy should be radically reorganized and placed on a firm all-India basis. The basic educational qualifications of the aspirants to the profession should be raised. The training given should be made more exacting and comprehensive. The standards of education should be made uniform all over India. The exercise of the profession should be subjected to restrictions which would make for efficiency and improve its status, dignity and sphere of usefulness. In holding these views, we feel that we have the weight of the whole country behind us. We consider that the control should be exercised through the medium of an authoritative body consisting mainly of the representatives of the profession who may be safely expected to uphold its prestige and into whose hands its interests may be confidently entrusted.

243. In drawing up our scheme, we have taken guidance from the conditions existing in Great Britain. The standards of training which we have outlined follow closely those laid down by the Pharmaceutical Society of Great Britain, for the Chemists and Druggists' course with necessary modifications to suit the Indian requirements. The course embodied in our scheme is far above the standard which is at present aimed at by the Compounders' course in vogue in India and it follows that the term 'compounder' can no longer be applied justifiably as a correct description of this class of people. They may be suitably designated as 'Pharmacists' or 'Chemists and Druggists'. The 'Compounder' would seem to be an anachronism at the present day and

no good will be done by keeping that class or designation alive. That the existing compounders are not, by virtue of the training which they receive, capable of handling potent and poisonous drugs which have been recently added in large number to the therapeutics and that they cannot be relied upon to safeguard the life and health of the public, substantially emerge, as the considered opinion of those competent to judge, from the evidence placed before the Committee. It is true that the scheme of the Committee, if given effect to, will involve increased expenditure all-round. Higher standards of education for a longer period will necessarily be more costly. The recipients thereof will claim or require better pay and emoluments and this will naturally react on the cost of the medicine which the consumer will be ultimately called upon to bear. But, these considerations cannot be permitted to deflect us from the formulation of a scheme which, in our view, embodies the mere minimum requirements for the improvement of a profession so vital to the well-being of the country and its people.

244. The preliminary qualification required for admission to the course should be fixed as the Matriculation examination of the Universities or any other equivalent standard, such as the S.S.L.C. examination conducted by the Government of Madras. No stress is now laid as to the basic qualification except in the recently revised Compounders' course in Bengal and the Chemists and Druggists' course in Madras. The mere ability to read the prescription in English and write from dictation is deemed to be sufficient with the result that practically anyone, however ill-equipped he be in general education, is at liberty to take up the course without any sort of preliminary preparation or training whatsoever. The science of pharmacy requires an elementary knowledge of physics, chemistry, and botany and these cannot be properly understood and appreciated without better preliminary training.

245. The entire course of training of a pharmacist, leading to a pharmacist's diploma, should be so arranged that it should occupy at least a period of two years. The first year should be spent in the study of botany as applied to pharmacy, inorganic and organic chemistry, physics and theory and practice of pharmacy (elementary) and pharmaceutical arithmetic (weights and measures). After passing the examination at the end of the first year, a period of apprenticeship should be undergone along with the second year's course. This period of apprenticeship is designed to give a good grounding in practical pharmacy and the principles involved in the actual management of a pharmacy or drug store. In order that this essential accompaniment of a year's training is not undergone in a perfunctory or haphazard fashion, the institutions, hospitals and dispensaries where such training should be imparted should be specified by the Provincial Pharmaceutical Council, to the constitution of which reference will be made shortly. It may be that, at the commencement, sufficient number of qualified chemist's shops capable of entertaining apprentices may not be readily available and that some

of the big hospital dispensaries with a qualified staff will have to be requisitioned for the purpose. The difficulty, however, is of a temporary character and will soon be overcome with the increase in the number of qualified chemists turned out year after year under our scheme.

246. The second year's course should include a study of the theory and practice of pharmacy (advanced) and the student should be taught the technique of using a microscope so that he might utilize his skill in the diagnosis of crude drugs. Great stress should be laid on the teaching of pharmaceutical chemistry so that with further training the students might be in a position to help in the carrying on of drug manufacturing work. An elementary knowledge of the action of drugs with special reference to toxicology is essential not only to give a lively interest to the pharmacists in the medicines he deals with, but also for impressing him with the sense of grave responsibility which attaches to his profession in the handling of potent and poisonous remedies. A knowledge of laws that affect pharmacists is of primary importance in countries like Great Britain and America. There are a number of laws dealing with the practice of pharmacy, poisons and narcotic drugs in those countries and a pharmacist is expected to uphold and conform to the laws and regulations governing the exercise of his profession and the distribution of these substances. As matters stand at present, the Statute Book in India is not overburdened with legislation relating to pharmacy, although there are some Acts such as the Indian Poisons Act, 1919, the Dangerous Drugs Act, 1930, and other allied ones, with whose provisions he should be required to be conversant. The final examination at the end of the second year should be of a very searching nature and should test the candidate's knowledge, both in the theoretical and practical portion of his work. A *viva voce* examination should be taken to test the candidate's presence of mind and resourcefulness.

247. In concurrence with the views of many witnesses, the Committee considers that the institution of degrees in Pharmaceutical Chemistry in the different Universities of India would be a step in the right direction and would, therefore, strongly recommend that necessary action should be taken for achieving it. Apart from its intrinsic merit, it would not be possible to utilize the enormous raw materials available in India or to give stimulus to the manufacture of drugs without well-trained pharmaceutical chemists of a superior order. There is no doubt that a University degree would be a very great incentive to the younger generation and the institution of it would, in the long run, turn out experts who could hold their own against the manufacturers of the Western countries and tend to free India from its deplorable dependence on imported drugs. Most of the Indian Universities, we understand, have fairly equipped science laboratories which, with slight modifications and alterations, might well be utilized for the purpose of giving training in pharmaceutical chemistry. The practical training might be carried on with the co-operation of the manufacturing concerns in the Provinces of Madras, Bengal and

Bombay. In the latter two Provinces, there are private drug-manufacturing enterprises with suitable facilities, while in Madras the Government Medical Stores Depot can be requisitioned for the purpose. There are no such manufacturing concerns in other Provinces, but, in course of time, we are hopeful that such concerns would come into being there also. We are convinced that the absence of facilities in some of the Provinces for practical training should not be allowed to stand in the way of giving a trial to our scheme in the major Provinces at least. It is unnecessary to go into the details as to the place and the period of study required for the degree. The degree should be taken, just like any other science degree in the University, two years after the Intermediate examination or four years after the Matriculation examination or its equivalent. The recommendation of the Bombay Medical Union that the degree should be conferred two years after graduation would seem to involve too high a standard and the Committee have grave doubts about its practicability at the present stage. Such a heavy course may not attract a sufficiently large number of students, at the outset at any rate. Provisions for post-graduate courses may well be considered after the scheme is given a fair trial and proves a success and receives adequate appreciation.

248. The proposal of a special College of Pharmacy has received the consideration of the Committee. The utility of such independent institutions for promoting pharmacy has been acknowledged on all hands and does not require any special pleading. Such Colleges exist in certain countries in the West. Medical experts, pure and simple, are, no doubt, ill-equipped for training pharmacists, but, having regard to the existing conditions, we do not think we will be justified in recommending the establishment of an exclusive college at once. Pharmacy has not advanced enough in India and the need for advanced pharmaceutical education does not appear to have received sufficient recognition as yet. We would defer the establishment of an independent college until public opinion grows in volume and strength and makes itself distinctly felt in its favour. It is, no doubt, an ideal to which we look forward and like all ideals should be approached with caution and by gradual stages. Until its realization, the best expedient would seem to be to make requisite arrangements in the existing medical colleges and schools of which there are many, scattered all over India, for the training in pharmacy. The Department of Pharmacology in the various medical institutions, with suitable modifications and adjustments, can be utilized for the purpose with satisfactory results.

249. The machinery for regulating and controlling the profession of pharmacy remains to be dealt with. Licensing and registration have been generally recommended. We think that stringent provisions in this direction should be made for the efficient exercise of control. Every place where drug and medicines are sold or dispensed would be duly registered as well as licensed as mentioned

in the previous chapter. Complaints have been received about the want of uniformity, and in some cases of fraudulent use, of weights and measures in the dispensing of medicines and in the sales of drugs, etc. In the absence of a comprehensive legislation to provide for standards of weights and measures for use in India in all cases, the Committee would recommend that the Governor-General in Council, in consultation with the Advisory Board, should be empowered to standardize weights and measures for use in the dispensing of medicines and in the sales of drugs and that it should be a condition of the licence that the use of weights and measures in contravention thereof should involve punishment of the person responsible for it in addition to the cancellation of the licence. We consider that all persons following the profession of pharmacy should be registered and that none but qualified persons should be eligible for registration. The possession of a pharmacist's diploma or degree, mentioned above, would ordinarily be the proper qualification for the registration of a pharmacist. This restriction, however, needs relaxation in certain cases. The claims of qualified medical practitioners for registration cannot be ignored. In India, the system of combining the practice of medicine with that of dispensing is rightly or wrongly in vogue, although, in most of the foreign countries, medicine and pharmacy are kept entirely distinct and the medical practitioners are not allowed to carry on the work of dispensing. In view of the fact that the system is ingrained in India and having regard to the scarcity of qualified pharmacists, we think it right to permit its continuance without interference. It is not for us to go minutely into the ethics of such combination, but we fail to perceive anything flagrantly indecorous or unrighteous about it. We would, however, insist that a medical practitioner who owns or runs a pharmacy or drug store cannot be permitted to do so unless he is actually registered as a pharmacist. We do not feel compelled to lay down that registration as pharmacist should lead to the automatic removal of the name from the roll of medical practitioners. We understand that there are a number of graduates in science of the Indian Universities who have attained proficiency in the drug trade, particularly on the manufacturing side. Some of them are employed in the private manufacturing establishments in Bengal and Bombay and seem to possess competency and skill which compares favourably with those of the qualified pharmacists of other countries. It is desirable that recognition should be extended to them on proof of sufficient training in pharmaceutical chemistry and that they should be held eligible for registration. We are also of opinion that persons with foreign registrable qualifications should be allowed to be entered in the register. Hence the holders of a British, American or any other foreign degree in pharmacy or of a diploma of the Pharmaceutical Society of Great Britain will be qualified for registration. We do not think it necessary to impose further restrictions by confining the profession to *bona fide* residents or natives of the place as is done in some of the colonies.

250. In the transitional stage, qualified pharmacists may not be available in sufficient numbers. Persons engaged in continuous practice of the profession for a period of five years may be expected to have sufficient capacity to discharge their duties and may accordingly be registered notwithstanding the absence of requisite qualifications. The standard of training received by those who have successfully passed the Chemists and Druggists' course of the Madras Medical College is fairly high and the inclusion of such persons will not lower the standard of the profession to any extent. Compounders who have undergone the revised compounder's course of the State Medical Faculty of Bengal or who have been actively engaged in dispensing work for not less than three years after successfully passing the ordinary compounder's course may also be held to have sufficient qualification for purposes of registration. We would recommend that for a period of five years from the commencement of the scheme persons having such qualifications should be held entitled to claim registration. There is no need to extend the concession any further.

251. To ensure efficiency in the discharge of duties and to guarantee that the drugs and medicines compounded, mixed, prepared, dispensed or sold, are of proper strength and quality, it is essential that the work should be exclusively reserved to a pharmacist who is specially trained for it. No person, therefore, who is not duly qualified and registered should be allowed to carry on compounding, mixing and selling of drugs and chemicals. An untrained person cannot appreciate the value of scrupulous accuracy; nor has he sufficient knowledge of chemistry and pharmacy to enable him to foresee and deal with chemical reactions which may in some cases be intended by the prescriber and in others be accidental and possibly avoidable by the adoption of special methods of dispensing. A qualified person can check accidental errors in prescriptions. Exception should, however, be made in the case of a person selling drugs and chemicals in the ordinary course of wholesale dealing, of persons selling drugs and chemicals in unbroken packages and of those selling useful household remedies prescribed by the Governor-General in Council. A firm or a company or a person who is not properly qualified may be permitted to own a drug store or pharmacy so long as the management is undertaken by, or under the supervision of, a qualified registered pharmacist. This restriction should be enforced not merely in respect of open shops and dispensaries but, in all fairness, it should also be extended to hospitals. It is true that, under the pharmacy laws in force in England, the restriction does not apply to dispensing in hospitals, apparently because it is usually done under expert supervision. In view of the conditions prevailing in India where hospitals of all kinds and dimensions are conducted or owned by different bodies and institutions, it is, in our view, eminently desirable to make the restriction fully comprehensive and leave no loophole for any mishap. We know that there are places where the appointment of a qualified pharmacist is neither necessary nor practicable owing to the small

amount of dispensing. In such cases the Provincial Pharmaceutical Councils should have power to exempt the institution concerned from this provision. The dispensing must, however, be under the careful supervision of a medical practitioner.

252. The titles 'Registered Chemist,' 'Pharmacist,' 'Chemist and Druggist,' 'Dispensing Chemist,' 'Chemist' and 'Druggist' should be restricted to qualified persons. The title of 'Pharmaceutical Chemist' should be reserved to pharmacists possessing University degrees. It is a necessary corollary that the use of any sign holding out or implying that he is a registered pharmacist by an unregistered person should be prohibited. The restriction about the use of titles is essential and of primary importance from every point of view. It will serve to protect the public from being misled and will confer added dignity to the profession. Such restrictions on the exclusive use of titles, it may be mentioned, are enforced in England and in other countries.

253. The question as to the authority with whom the enforcement of the control should vest remains for consideration. The formation of a Pharmaceutical Society on the lines of that existing in England and America has been stressed by most of the witnesses. In those places, the profession of pharmacy is controlled by voluntary organizations set up by the pharmacists themselves with a view to improve their interests and status. The organizations are recognized by the States and in matters relating to pharmacy and public health the views expressed by them are accorded proper consideration. In England, the society was granted in 1843 a Charter to conduct the examinations, issue certificates and to register qualified pharmacists. The Pharmacy Act of 1852, which confirmed the Charter of 1843, and the subsequent Acts entrusted the registration and general control of pharmaceutical chemists to this society. The American Association of Colleges of Pharmacy have great influence on the profession. A control by an organization of this nature is the goal to be worked up to. *In Madras, there is a body called the Pharmaceutical Society of India; but it is not in a fully developed condition and cannot be regarded as being* anything more than a nucleus. Another method of check which suggests itself is direct control by the State. Such a check is exercised in some of the countries of the Continent where all pharmacists are controlled by the State and limited on population basis. It does not seem to be practicable to follow such a course in a vast country like India. Having regard to the fact that the profession is still in its early beginnings here, it would seem to be safer to adopt a middle course which would cause the least disturbance of existing things. We would recommend the creation of a General Council of Pharmacy as a central controlling body with Pharmaceutical Councils in the different provinces linked with it.

254. A Pharmaceutical Council consisting of eleven honorary members should be established in each of the Provinces in India including administered areas and commissionerships. Of these eleven members, seven should be elected from among the registered

Pharmacists and four (who need not necessarily be registered Pharmacists) should be nominated by the Local Government. The period of office of each member should be three years from the date of election or nomination, as the case may be. Such a Council would be thoroughly representative in character. Each Provincial Council should hold at least one meeting during every period of three months. Its functions should be (1) to maintain a register of all registered pharmacists of the Province and to register the names of pharmacists on payment of such fee as may be prescribed by the regulations of the General Council of Pharmacy, (2) to specify the educational institutions in which candidates for Pharmacist's examination should undergo training and the places in which and the conditions under which apprenticeship should be served, (3) to conduct examinations for pharmacists under the guidance of the General Council of Pharmacy and to grant certificates, (4) to investigate all complaints regarding registered pharmacists of the Province and to remove the name of any person from the register of pharmacists for good and sufficient reasons, subject to appeal to the General Council of Pharmacy, (5) to restore for good and sufficient reasons the names of pharmacists already removed from the register, (6) to send to the General Council of Pharmacy an annual report of its proceedings during the last preceding year, and (7) to generally act under the control and direction of the General Council of Pharmacy. As there are no registered pharmacists in existence, the first Provincial Council should be composed wholly of members nominated by the Local Government.

255. A General Council of Pharmacy should be formed in one of the important centres to be chosen by the Governor-General in Council. Its functions will be mainly one of direction and control of the activities of the Provincial Councils. The Council should consist of fifteen members. Of these, twelve will be representatives from the Provincial Pharmaceutical Councils as mentioned below and three who need not necessarily be pharmacists will be nominated by the Governor-General in Council. The representatives of the Provincial Councils will be distributed as follows: each of the Provincial Pharmaceutical Councils of Bengal, Bombay and Madras should elect two representatives from among its members and each of the Provincial Pharmaceutical Councils of the Punjab, the United Provinces, the Central Provinces, Bihar and Orissa, Assam and Burma should similarly elect one representative from among its members to the General Council of Pharmacy. The Provincial Councils of other Provinces of India do not seem to require any special representation, as they have no peculiar interests of their own which others have not in common with them. To provide for a representative from every one of the Provinces would make the Council too heavy and unwieldy. In case of appeals from administered areas and commissionerships, however, the General Council will have power to co-opt for purposes of hearing the appeal, any member from the Pharmaceutical Councils existing in those places. The members will hold office for a period of three years from the date of election or nomination as

the case may be. The General Council should hold at least one meeting every six months. The General Council should have power to make regulations for the following purposes, namely: (1) to correlate and co-ordinate the activities of the different Provincial Pharmaceutical Councils; (2) to organize the practice of pharmacy by laying down a uniform system of training and education all over India; (3) to exercise disciplinary control over all the registered pharmacists in India including the right of hearing appeals from the different Provincial Pharmaceutical Councils; (4) to specify the fees and conditions for registration in respect of pharmacists; (5) to prescribe the form and contents of the registers to be maintained by the Provincial Pharmaceutical Councils; and (6) to make such by-laws and regulations as may be necessary for the better control of the profession of pharmacy from time to time.

Chapter VIII

Methods of Control—cont.

Patent and Proprietary medicines

256. We have shown elsewhere that, in the interests of the safety of the public, efficient control should be exercised over the import, manufacture and sale of patent and proprietary medicines and that there are no restrictive laws to that end in India at present. The degree, nature and method of control have given rise to some divergences of opinion among the witnesses. Before actually examining the proposals put forward by them, we shall glance at the methods in force in other countries.

257. In England, there is no law directly dealing with the subject. A large amount of preliminary work was done by the Select Committee of the House of Commons on "Patent Medicines." The Committee found that "for practical purposes the sale and advertisement of secret remedies (unless they contain scheduled poisons) is unrestricted by law." Thereupon the Proprietary Medicines Bill was introduced in the House of Lords which was based on the recommendations of the Committee. Its main provisions were that persons manufacturing proprietary medicines, as well as the medicines, should be registered and that the ingredients of the medicines and their proportions should be specified, not to the public, but to the department concerned. Registration was to be signified on the medicine by a number. The sales of medicines to effect cures of scheduled diseases, such as cancer, consumption, lupus, deafness, fits, epilepsy, amenorrhœa and other diseases peculiar to women, diabetes, paralysis, locomotor ataxy, Bright's disease, and rupture were prohibited. Advertisements of articles suggesting that they can be used for procuring abortion or miscarriage were forbidden. Treatment of ailments by correspondence was not permitted. It was an offence to publish fictitious, false or misleading testimonials, or to suggest that a proprietary article is recommended by a duly qualified

medical practitioner without giving his name and address or to suggest, contrary to fact, that the proprietary medicine was made by a medical practitioner. Every proprietary medicine, containing more alcohol than is deemed proper by the Minister of Health, should show on the package the proportion of alcohol contained in it, and the Minister had power to make regulations directing that the name and quantity of any poisonous or dangerous drug forming an ingredient in a registered medicine, should be stated on the label. Any injurious medicine may be removed from the register by the Minister, subject to appeal to the High Court. The Select Committee had recommended that this power should vest with a special court or commission composed of a judicial authority assisted by two assessors representing the Health Department and the London Chamber of Commerce. The Bill, with certain amendments, was passed by the House of Lords some years ago, but it has not yet been introduced into the House of Commons.

258. In the United States of America, the sale of patent and proprietary medicines is regulated by the Federal Food and Drugs Act. Misbranding is prohibited, and the label must bear a statement containing the quantity or proportion of alcohol, morphine, opium, cocaine, heroin, alpha or beta eucaine, chloroform, cannabis indica, chloral hydrate or acetanilid or any derivative or preparation of any such substances contained therein.

In Canada, registration is in force and, if certain specified drugs are present, the names and proportion of such drugs must be printed on the labels or wrappers. The names of all the ingredients must be disclosed to the registering authority and in the case of certain ingredients percentages also should be given. Labels should not contain false, misleading or exaggerated claims or any statement to the effect that it is a cure for any disease.

259. In the State of Victoria in Australia, every package containing a patent or proprietary medicine should have a label containing the names of the drugs having any therapeutic action. The label should not contain any statement which suggests (1) that it will remedy or cure asthma, Bright's disease, baldness, drunkenness, cancer, etc., or (2) that it is a universal panacea, a kidney cure, liver cure, blood purifier, a skin food, a hair food or a nerve food, or (3) that it will develop the bust, raise the height or eradicate wrinkles, or (4) that it is an abortifacient, or (5) that it is beneficial for sexual weakness or impotence.

260. In the State of New South Wales, the formulæ of proprietary medicines need not be disclosed except in so far as the provisions of the Pure Food Act, 1908, require it to be disclosed for securing freedom from adulteration or false description.

261. In France, the sale of secret remedies is prohibited by law and in Italy, medicinal compounds and special remedies must bear a label declaring the exact name of each ingredient and the dose; false statements with regard to them are punishable by fine.

262. The state of the law regarding advertisements and taxation may also be briefly adverted to at this stage. Under the Common law in England, the mere ' puffing up ' of goods is not actionable. But, if misrepresentation or fraud is actually established, a claim for damages will lie. Indecent or obscene advertisements are made punishable under section 3 of the Indecent Advertisements Act, 1889. Under section 5, any advertisement relating to venereal diseases, nervous debility or other complaint or infirmity arising from or relating to sexual intercourse, will be deemed to be a matter of an indecent nature within the meaning of section 3. Advertisements relating to venereal diseases are specially dealt with by the Venereal Diseases Act, 1917. Treatment of any person for venereal disease or offering him any advice for such treatment by advertisement or notice is prohibited except in any publication sent to duly qualified medical practitioners or chemists or unless special sanction of the Local Government Board is obtained. Holding out or recommendation by advertisement, handbills, etc., of any medicine or medicament for the prevention, cure or relief of any venereal disease is also prohibited. The Post Office Act, 1908, makes it an offence to send any indecent or obscene matter through post.

263. The civil law relating to advertisements is generally the same in India as in England. The sale, distribution or exhibition of obscene books, pamphlets, prints, drawings, etc., are made punishable by section 292 of the Indian Penal Code. A publication is said to be obscene when the tendency of the matter contained in it is such as to deprave and corrupt those whose minds are open to such immoral influence and into whose hands a publication of that kind may fall. Even if the matter published is not by itself obscene, the publisher will be punishable if he knew that it related to the sale of obscene books, photographs, etc. Section 19 of the Indian Post Office Act, 1898 (VI of 1898), prohibits the sending by post of any 'noxious' substance and section 20 prohibts the transmission of any indecent or obscene printing, photograph, lithograph, etc., or any other indecent or obscene articles. Articles sent in contravention of sections 19 and 20 may be opened; if noxious, they may be destroyed and, if obscene, may be disposed of as directed by a rule made by the Governor-General in Council. The sender is also liable to be punished with imprisonment up to one year or with fine or with both.

264. In America, most of the States have laws prohibiting statements which are untrue, deceptive or misleading in the advertisement of any merchandise.

In New South Wales, under the Pure Food Act, 1908, the Board of Health may cause any drug or appliance which is advertised to be examined, and the Governor may prohibit the advertising of any drug or appliance which is injurious to life or health, or which, by reason of its inactivity or inefficiency, is useless for the advertised purposes of cure.

In New Zealand, the Sale of Food and Drugs Act, 1908, was amended in 1924 so as to control publicity calculated to deceive a purchaser in regard to the virtues of a drug.

265. With regard to taxation, the position may be summed up in the language of the Report of the Taxation Enquiry Committee thus:—

> Patent medicines are generally considered as suitable subject of taxation, partly for reasons of regulation, partly because they involve a form of luxury consumption, which is occasionally harmful, and are taxed, among other countries, in the United Kingdom, Canada, South Africa, Italy, France, the United States of America, and Japan, though it is understood that in the last case the abolition of the tax is in contemplation. The tax is usually levied in the shape of a stamp duty and is collected with comparative ease, since advertisement is an essential of trade. In England, the charge of duty extends to all medicines in which any proprietary right is claimed, or which are advertised or held out without disclosure of the formula, as a cure for any ailment or disorder incidental to the human body. The adoption of a definition on these lines would meet one objection taken to the tax, namely, that it would interfere with the business of the vaids and hakeems. It will be clear that such interference would only arise in the case of advertised medicines, and not in that of prescriptions made up for private patients. A suitable rate for the tax would be 4 annas in the rupee. Its importance should be accompanied by the application of a similar definition to imported patent medicines and an increase in the tariff rate on these to 50 per cent.

266. Most of the witnesses are opposed to secret remedies on principle and their suggestions range from absolute disclosure of the composition and the formulæ on the label to little or no interference whatever. Doctor Rama Rao of Madras, Doctor Parulkar of Bombay, Lieutenant-Colonel Cook of Bhagalpore, Doctor Chand Lal Mathur of Muzafarnagar, Mr. Sethi of the United Provinces and Doctor Harihar Ganguly of the Carmichæl Medical College, Calcutta, would insist that all proprietary preparations should bear on their labels the percentage composition. Colonel Higham of Bombay would also press for the mention of the name of the manufacturer or of the importer, if of foreign origin. That the essential ingredients and their strength should be notified on the label is the view of the Chief Medical Officer of the B.B. and C.I. Railway Company. Nearly 60 per cent of the witnesses would be satisfied if the composition of the drug were given on the label. Lieutenant-Colonel Overbeck-Wright, I.M.S., Agra, Major Sahai, I.M.S., Kohat, and Doctor Sen Gupta of the English Pharmacy, Bilaspur, are some of those who suggest the formation of a controlling Board to whom the formulæ should be disclosed. Mr. Ramachandra Rao of Madras considers registration of patents as the best method of control. He is, however, for mentioning the names of the ingredients only, to the office, and not the proportions or the process of manufacture. With regard to the duties of the Board, some would recommend that the Board should register the particular preparations and issue permits for the sale thereof. Doctor Das Gupta of Benares, among others, would suggest that the medicines should be analysed by the Board and put on the market only in case they are found satisfactory. He and Doctor Ganguly of Calcutta would want the certificate of the Board to be affixed to the label. Licensing of manufactures, importers and vendors and registration of shops also find favour with some.

267. The expedient of special taxation is favoured by many. The Chief Medical Officer of the B.B. and C.I. Railway Company would levy a tax of 100 to 200 per cent *ad valorem* on proprietary medicines. Messrs. Smith, Stanistreet and Company suggested that a stamp duty should be imposed on all secret remedies as it is in vogue in England, but on a lower scale. In the opinion of the Inspector-General of Civil Hospitals, Assam, the only manner in which proprietary medicines could be controlled is by considerably enhancing the customs duties on all preparations which do not show their formula on the bottle. Doctor Frank Noronha of Bangalore states that a heavy import duty on foreign proprietary remedies and an excise duty on locally-made ones will make them expensive luxuries and prevent people from fully indulging in them.

268. Rigid control over advertisements is a point over which there is unanimity. To them is ascribed the great stimulus to the sale of such remedies. Doctor Parulkar of Bombay would go so far as to suppress them altogether in newspapers and to suggest that a Government permit should be obtained before the remedies are advertised. The suggestion that advertisements should be certified by a competent authority before publication is supported by others also. According to Doctor Maneckshaw of Amritsar, the controlling authority should be the Supreme Medical Council. Doctor Rodrigues of Karachi is for the establishment of a special Council of Pharmacy and Chemistry, who should report on all non-official remedies and nostrums on the lines of the United States of America. According to him, sales and advertisements should be stopped if the claims are not substantiated and the Postmaster-General and Railways should disallow postal and transit facilities for such medicines. The witnesses are generally opposed to advertising in lay papers. Doctor Henderson of the School of Tropical Medicine and Hygiene, Calcutta, advises that " reputable medical journals, both Indian and foreign, should be approached with a view to preventing the use of their columns for the advertisement of such remedies ". Mr. Selvanayagam of Madras stated that " every man who does any import business tries to secure a medical agency and sends a free sample to all the medical practitioners accompanied by reports and a host of testimonials of a doubtful nature. The medical man believing these reports prescribes these drugs to his patients." Leiutenant-Colonel Cook of Bhagalpur observed that " by every mail one is flooded with an amount of literature explaining the virtues of these drugs to practitioners in such a way that one is tempted to try some of these preparations about whose purity and efficacy doubts might exist. Besides, a large number of representatives of various manufacturing firms are going about in different parts of India explaining the virtues of these remedies to practitioners."

269. The publication of a book containing the results of analysis of drugs on the lines of ' Secret Remedies ' is commended by some. Doctor Lakshmanaswami Mudaliar of Madras observes; " That in

cases where proprietary remedies are offered for sale with bellicose advertisements there should be some machinery like the Committee of the British Medical Association which sits to investigate many of these remedies and gives an authorized opinion of their value. This would help very materially the practitioners in making a wise selection of such proprietary remedies and will go far to check the evil of indiscriminate advertising." Doctor Tirumurti of Vizagapatam believes in counter propaganda and exposure of the composition of secret remedies by analysis undertaken by a body of pharmacologists and chemists appointed by Government. The advantages of the spread of general education is, in this connexion, stressed by him. Doctor Rama Kamath of Madras, who also emphasizes the efficacy of the education of the public, wants that duty to be entrusted to the qualified medical profession.

270. We have attentively considered the valuable suggestions of the witnesses, including the elaborate schemes put forward by some of them. Doctor Das of the Robertson Medical School, Nagpur, Doctor Phani Bhusan Mukerjee of Patna, and the Bombay Medical Union, among others, have given us such schemes. We shall first deal with proprietary medicines with secret formulæ. We feel that absolute prohibition or restrictive measures of a stringent nature are wholly impracticable. We do not think that the time is yet ripe for a full disclosure of the formulæ or of the composition on the label although this has been insisted on in some countries. As observed by Colonel Higham, I.M.S., Bombay, such disclosure is not a complete safeguard as it would always be possible for manufacturers to attach labels that did not correctly describe the contents and in many cases the action would defy detection. Probably the most important argument against this measure is that in every province, possibly in almost every town, imitations with the same or very similar formulæ will be offered to the public. Disclosure of the formulæ and the details of the therapeutic activity to a Board and the grant of permission by it after analysis may be less open to objection. But the argument against such a procedure is that a certain official 'imprimatur' would thereby be given or claimed. In fact, as mentioned by some of the witnesses, there is the danger that the very fact of control, however light it be, is liable to be misinterpreted as approval of its use.

271. While opposed to unnecessary interference, we feel strongly that a regulating influence is called for. It should include within its purview all kinds of patent and proprietary medicines without regard to the particular system to which they belong as we are convinced that, for practical purposes, no distinction can be drawn between the patent and proprietary medicines of the different systems. We accordingly propose that our recommendations under this head should apply to all such remedies alike, irrespective of the system of medicine concerned. Provisions for registration and the issue of a certificate after the mention of each medicinal ingredient to the department concerned, on the lines of the

Patent and Proprietary Medicine Act of Canada, would seem to us to be eminently desirable. Though the secret of the formulæ is not given away, such a course has the advantage of enabling experts to get sufficient clue to analyse them and to prohibit their use if necessary. Regulations may be made for their analysis by the central and provincial laboratories, and the Governor-General in Council, in consultation with the Advisory Board, may be empowered to ban their use if they are found harmful or of a bogus nature and the manufacturer or importer punished and stocks forfeited. It is true that proprietary remedies of the indigenous systems of medicine may not lend themselves to easy analysis, but the essential nature of a substance and the character of its ingredients can be ascertained without much difficulty.

272. The registration of proprietary medicines should be on payment of a prescribed fee and need be only once. If alcohol in excess of $2\frac{1}{2}$ per cent is present, the name and proportion of each ingredient, which medicates the preparation so as to unfit it for use as an alcoholic beverage, should be given to the department. If certain specified drugs, namely, those mentioned in the Schedule to the Patent and Proprietary Medicine Act of Canada, such as Belladonna are contained in the preparation, the proportions of the ingredients should be given to the department and mentioned in the label as provided for in that Act. Opium and its derivatives in medicines for internal use and cocaine and its salts in any medicine, whether for internal or external use, should be prohibited. Drugs must be designated by their commonly used names. The provisions relating to inspection, seizure, etc., mentioned in Chapter VI should be made applicable to proprietary medicines also.

273. We feel that there is great force in the criticisms directed against advertisements. A few samples of them are set out in Appendix I of Part II. The methods of advertising are many and varied. The disgust and annoyance aroused by the advertisements is nothing compared to the untold harm they inflict on the people. The publishers' responsibility cannot also be ignored. For the elimination of fraudulent advertisements, it is essential to punish the printer and publisher as well as the person responsible for it. It is true that control over advertisements in other trades is lax and the introduction of control over advertisements relating to proprietary medicines may actually lead to undue interference in legitimate trade in certain cases. But, in view of the peculiar character of proprietary medicines with secret formulæ and of the extent and gravity of the injury resulting from fraudulent advertisements, we feel that there is great need for strict surveillance in the field of advertising and would recommend imposition of restrictions on it. We think it essential that advertisements relating to aphrodisiacs, venereal diseases, remedies for the diseases of women, cures for cancer, leprosy and tuberculosis should be prohibited. No false, misleading or exaggerated claims should be made on the labels, wrappers

or advertisements. For the rest, we are content to leave the control of advertisements to be regulated by rules made by the Governor-General in Council.

274. It is a well known principle of taxation that there is no objection to the levy of a tax where the commodity taxed is largely consumed in excess of what is salutary. So far as such excess is prevented by the tax the restriction is positively beneficial to the community. We have, therefore, no compunction in proposing additional taxation. Patent medicines imported into the country should, in addition to the customs duties already levied, bear a special duty of 20 per cent *ad valorem*. This does not err on the side of severity, in view of the rate of 50 per cent recommended by the Taxation Inquiry Committee already referred to. Patent medicines manufactured in India should bear a revenue stamp of not less than 2 annas on each rupee of its market value. This stamp should be affixed in such a manner that it should not be possible to open the package without destroying or defacing it.

275. Proprietary remedies with disclosed formulæ do not really require to be subjected to any special restrictions except the general provisions about inspection, seizure, etc., designed to secure freedom from adulteration and misbranding.

276. Apart from a recommendation to the medical profession not to prescribe proprietary medicines when there are equally useful drugs in the pharmacopœia, and to read the literature and advertisements in the light of their own knowledge and professional experience, we do not think there is any special necessity for interference.

277. Nevertheless, as it not infrequently happens that when a proprietary drug becomes popular, it is advertised to the public under unwarranted and misleading claims, we would urge some restrictions on the sale of such drugs:—

(*a*) The name to reflect the composition of the product and not the clinical use to which it is put.

(*b*) The provisions as to advertisements of patent medicines with secret formulæ should apply to these also.

(*c*) The formulæ to be exhibited on the label of the actual container—if a simple chemical substance, the scientific name and chemical formula; if a mixture, the details of its composition with actual quantities of active ingredients.

SECTION IV

CHAPTER I

Development of the drug industry in India

278. The root cause of the traffic in adulterated drugs is traceable, on ultimate analysis, to the demand for cheap medicines which unscrupulous manufacturers and dealers have not been slow to exploit. In the absence of restrictive laws, a certain class of manufacturers and dealers has been successfully flooding the market with inferior products. The true remedy for this state of affairs lies in the organization of the drug industry in this country. It would then be able to satisfy the conditions which might be prescribed by a properly considered drug control legislation, and to put on the market standard goods which would suit the purchasing capacity of its people. From the very beginning, the committee realized the interdependence of the question of stimulating the manufacture of drugs in the country and that of ensuring the supply of pure medicines of proper standard at moderate prices.

279. India abounds in medicinal plants and the existence of many possibilities for drug manufacture in this country emerges clearly from the fact that foreign manufacturers draw their supply of many of the raw materials from India. Foreign manufacturers, it is well known, export large quantities of prepared medicinal drugs to India and ply a prosperous trade.

280. In discussing this problem, it is necessary, in the first place, to deal with the difficulties that the local manufacturers have to contend against under the existing conditions of the drug trade in this country. The evidence disclosed that the disadvantages, from which they suffer, are many and varied. This naturally hinders the development of the trade. The producers of pure and unadulterated drugs find it increasingly difficult to compete against those who do not hesitate to sacrifice quality or to resort to adulteration or misbranding to satisfy the popular demand for cheap medicines. Insufficiency of spirit content in tincture preparations, low percentage of ingredients, and substitution of inert and inexpensive materials, are amongst the methods employed to induce the unsuspecting public to buy spurious and adulterated drugs. Respectable firms, who manufacture drugs in strict conformity with the standards of the British Pharmacopœia in well-equipped laboratories, staffed by trained experts, are at a positive disadvantage against competitors, who, on account of the inferior quality of their products,

are able to quote conisderably lower rates. Honest firms who do not stoop to such debased tactics are thus practically forced out of the market by unfair and unequal competition. The present uncontrolled and unrestricted conditions of the drug trade puts a premium on dishonesty and discourages *bona fide* manufacturers who prefer to follow upright business methods. Many of the firms of repute in this country have made strong representations on the subject. The Union Drug Company of Calcutta observe as follows:—

> Is it not a fact that in India any person, educated or uneducated, is at liberty to sell any coloured spirituous preparation in the market as good tincture? The laws do not prevent him. Naturally an honest manufacturer does not get his price for his good preparations because he has to compete with the adulterated pharmaceuticals.

281. The diversity of excise regulations in different provinces may be prominently referred to as a great handicap to manufacturers of spirituous preparations. Witnesses from Bengal, which is perhaps the largest manufacturing province of the country, strongly pleaded for the uniformity of excise regulations throughout India. One of our co-opted members, Mr. S. B. Sen of the Bengal Chemical and Pharmaceutical Works, in a valuable memorandum with which he favoured the Committee contended that, as the excise duty on spirit required for medicinal preparations was the same in all provinces, any spirituous medicinal preparation on which duty has once been paid to the Excise Department should be free from restrictions regarding export from one province to another. Mr. N. Bhattacharya of the Union Drug Company, and representative of Messrs. Smith, Stanistreet and Company of Calcutta vigorously stressed this point of view before the Committee. When spirituous preparations are exported from Bengal to Bombay, the authorities of the latter province refuse to accept the certificate of duty passed by the Excise officers of Bengal and insist upon the goods being submitted for re-analysis of spirit content and revaluation of duty by their own officers before they are delivered to the consignee. In the inland towns of the Madras Presidency, the druggists are not allowed to import spirituous preparations from another province in India, unless they obtain an import permit from the Excise Commissioner, assess the duty payable on the goods and pay the same in advance. This seems to be a dilatory and vexatious procedure which will hamper trade and cause needless embarrassment to the manufacturer. The iniquity of the procedure becomes more obvious when contrasted with the regulations with regard to the import of spirituous preparations from foreign countries. In such a case, the duty having once been paid at the port of entry, no further restriction is imposed against transmission from one province to another. Notwithstanding the argument advanced by the Excise authorities concerned that the imported preparations bear a much higher duty than those manufactured in the country, we feel that this is a discrimination in

favour of goods imported which is detrimental to the interests of the Indian manufacturers. If the preparations sent from one province to another are supported by a certificate from a competent authority, the necessity to re-test them is not evident. It is well known that alcoholic determinations for the same product made by different experimenters are liable to slight variations. Hence, in the case of such re-tests, it is not clear whether any, and, if so, what variations from the declared figure are allowed.

282. Furthermore, the position is anomalous as there are no inter-provincial boundaries for the inspection of goods similar to those existing between different countries. The person, who actually suffers, is the known manufacturer with a bonded laboratory. Other dealers, it would appear, could send spirituous preparations to different provinces without detection. It is difficult to see how the regulations can be enforced without the establishment of definite '*frontiers*' and arrangements for the examination of consignments from other provinces, both by road and rail.

283. A suggestion to the following effect has been made to the Committee, namely:—"That the duty on spirituous medicinal preparations should, in all cases, be collected at the place of manufacture by the Excise Department of that province and that there should not be any restrictions regarding export from one province to another in British India after the excise duty has once been realized. From the statement of the export to the different provinces by manufacturers, duly checked and certified by the Excise staff attached to the bonded laboratories, duty on preparations exported to different provinces can be accurately calculated. It can then be adjusted as required between different provincial Governments by subsequent book-transfer." Messrs. Smith, Stanistreet and Company, Limited, put forward the view that the revenue from excise duty on medicinal preparations might be credited to the Central Government and thereafter distributed between the different provinces. Without definitely committing ourselves to any particular suggestion, we recommend that the question be brought under immediate examination by the Central Board of Revenue and Excise authorities in different provinces with a view to do away with these restrictions which are unnecessarily hampering the development of the drug industry.

284. The hardships inflicted by the working of the Excise regulations do not end there. In the province of Bombay, the recovery of alcohol from the marc is, we are informed, prohibited in opposition to the universal practice which obtains in every other country in the world. In the province of the Punjab, there is a rule which enjoins on all the manufacturers to give intimation to the Excise Department before commencing work, with a view to enable them to send an officer for the purpose of supervising the work. As the bonded warehouse is kept locked up, the manufacturing work can be carried out only when the officer is in the premises.

But often he does not arrive until about 10 or 11 a.m. and leaves the place at about 3-30 p.m. The result is that the ordinary working hours of the day cannot be put to the fullest use and sufficient time is not available for carrying on the manufacture. In the province of Bengal, it is a standing complaint of most of the bonded warehouse owners that they have to bear the entire cost of the Excise establishment in charge of the warehouse. This is, by no means, an insignificant sum and may, in many cases, be substantial. It does not seem to be fair that private manufacturers should be obliged to bear the expenses of the staff of a department of the Government deputed for its own purpose of special protection.

285. The demand of the indigenous manufacturers for duty-free spirit for use as solvents in experimental and research work also deserves sympathetic consideration. The question of solvents as a whole has an important bearing on the drug industry. Solvents have to be extensively employed in the manufacture and refining of chemicals, alkaloids, etc., for medicinal use and hence such manufacture is largely dependent on their supply. With the exception of alcohol, most of the other solvents, such as chloroform, benzene, petroleum, ether, acetone, methyl alcohol, etc., have to be imported from other countries and high prices have to be paid for them. This is ultimately reflected in the increased price of medicinal drugs. Many of these could, however, be manufactured with advantage from raw materials available in India at very cheap rates, provided there was a demand for the other by-products from the coking of coal or destructive distillation of wood. Unfortunately, until a demand arises, there seems no possibility of producing these solvents at a price which would favourably compare with the prices prevailing in other countries.

286. Over 90 per cent of the machinery required for pharmaceutical processes, such as percolators, tincture presses, vacuum stills, emulsifiers, tablet and pill machines, autoclaves, etc., are imported from foreign countries. With a little organization, these could be made cheaper in India. A Calcutta firm has already prepared such machinery successfully and it is selling at less than half the price of the imported articles. The development in this direction is an essential accompaniment for the growth and expansion of a drug industry in India.

287. Many witnesses in different provinces have drawn the attention of the Committee to the difficulty of identifying, selecting and procuring medicinal herbs of good quality. There appears to be a large demand for such raw material, but the supply is not commensurate with it. If a regular supply of genuine raw materials is assured, a great obstacle will be removed from the path of the drug manufacturers in India. It will also confer incidentally a lasting benefit to a large section of the population, dependent on the indigenous practitioners, who now obtain their supply from *Pansaris* and *Attars* dealing in stocks usually old and inert and stored under very unsatisfactory conditions.

288. Cultivation of medicinal plants on a commercial scale under Government experts will, in the opinion of many witnesses, remove one of the serious obstacles to the development of drug manufacture in India. The Committee considers that the practicability of the suggestion should be further explored. India is a veritable emporium of medicinal plants. Nearly three-fourths of the drugs mentioned in the British and other Pharmacopœias grow here. India possesses climatic conditions varying from the torrid to the frigid. It embraces vast tracts of tropical plains, temperate hills and valleys, irrigated soil, and moist and dry climates. It has, in fact, been described as the epitome of climates, seasons and soils of the British Empire. It is, therefore, possible that the drugs which do not now grow within her bounds can be made to do so. Acclimatization is possible to a large extent with almost any plant, and there are many instances where plants, indigenous to one country and originally marketed from there only, have been successfully introduced into other countries.

289. In India, reliance has been, so far, almost entirely placed on the natural resources of the country and herbs growing wild have been chiefly collected and utilized. The great impediment in the development of forest drug resources has always been the question of transport. These forests, in many instances, are situated hundreds of miles from the railway and consequently the transport of forest products is beset with difficulties and expense. Moreover, the forest resources, even if utilized to the fullest extent, will not be found sufficient for the needs of the country as many important medicinal herbs and plants do not grow in India in a state of nature. The subject of cultivation of medicinal plants, therefore, should receive the special and careful attention of the Government.

290. Important medicinal plants, such as digitalis, ipecacuanha, cinchona, jalap, etc., have already been grown in India and there is no reason why the country should not grow almost every drug needed to supply her own wants and at the same time develop a large export business. A large export trade in some of the pharmacopœial drugs already exists. Little reliance can be placed on the nature and quality of the wild grown drugs, and this presents a serious drawback to their employment for therapeutic purposes. It is for this reason that India imports not only prepared drugs, but also raw materials to the extent of many lakhs of rupees annually. Vast tracts of land are available in this country which, if utilized for systematic cultivation, will make genuine drugs available to the people at a reasonable price. In countries like Germany and Belgium, medecinal plant and essential oil gardens have proved a great success. The State authorities in France and America have displayed a great deal of interest in growing drugs on an extensive scale. In the United States of America, there is a Bureau of Plant Industry attached to the Botanical Survey Section of the Department of Agriculture where all questions

relating to the development of drug cultivation are considered. This bureau sends its agricultural experts to various parts of the world to investigate the climate, soil and environments suitable for the growth of a particular plant with a view to introduce it into their own country. The idea of the progress made is evident from the publications of the department which appear from time to time. Even the Commonwealth of Soviet Russia has started a bureau for carrying on a drug trade. Those departments are doing splendid work in their respective countries.

291. The establishment of a drug emporium in India was suggested many years ago, but has not yet materialized. Experimental drug farms have been started on a small scale in places like Mungpoo and Saharanpur but their spheres of activity are limited. Creation of greater interest in this direction will prove advantageous to the country in general and to the drug industry in particular. The Government of the United Provinces has already taken the right step by appointing a Committee of Experts to investigate this question—a lead which other Local Governments may, with advantage, follow. The co-operation of expert botanists, pharmaceutical chemists, and pharmacologists, is essential for the success of any scheme to further drug cultivation. Their advice will be valuable not only regarding the locality where particular drugs can be successfully cultivated, but also about the time suitable for cultivation, collection, etc., with a view to obtain the maximum activity and yield. They can devise methods for improving the content of active principles in cases where they are deficient. The establishment of the Imperial Council of Agriculture, with the large funds at its disposal, ought to make this easy. The Committee would urge on the Government to impress on the Council the necessity for giving immediate attention to this important aspect. Without development in this direction, the drug industry in this country will take a long time to take root and flourish.

292. The memorandum submitted to the Committee by the Bombay Medical Union urges the imposition of high tariff for the protection of the indigenous drug industry. We consider the question of protection of the drug industry to be of such primary importance that we recommend the reference of the question to the Tariff Board for thorough investigation which strict interpretation of our term of reference and shortness of time at our disposal precluded us from undertaking. We are nevertheless convinced that an increase of the custom duty on imported manufactured drugs by 5 per cent will accelerate the growth of the indigenous industry as against foreign competitors. Increase of duty will, no doubt, affect the consumers to a certain extent but the consumer will be compensated by the inevitable reduction of the cost of drugs, which the resultant development of indigenous industry will ultimately bring about. Moreover, we have been assured by many of the chemists and druggists that the effect of this increase in

duty on the retail price will be almost imperceptible. In recommending the increase of tariff, we have been greatly influenced by the consideration of financing the scheme of central control of drugs, which we have recommended in another part of the report, out of the proceeds of this extra duty.

293. Our colleague Mr. Abdul Matin Chaudhury dissents from our recommendation for increase of duty on imported drugs, as he considers that it will lead to increase in the retail price and restrict consumption. Control of adulterated drugs, in his opinion, is one of the primary obligations of the Government and should be financed from the Central Revenues without imposing additional burden on the consumer.

294. The import of raw materials not available in India, however, deserves special treatment. Crude drugs which have to be imported are subject to a duty which has now been increased to 20 per cent. In the competition with reputed firms of foreign manufacturers having tremendous resources at their disposal and who go in for mass production, the infant industry in India needs all the assistance that the State can reasonably afford. The total abolition or appreciable reduction of this import duty, the Committee considers, will afford material relief to the Indian manufacturers and tend to ease the situation considerably. It will lessen the hardships and disadvantages to which they are now exposed. A list of some crude drugs which at present are not grown in India and have to be imported will be found in Appendix M. of Part II.

295. Many of the witnesses representing the manufacturing interests have complained of the high railway freight for transportation of raw material and medicines manufactured in India. In the case of *Messrs. Alembic Chemical Work Company, Limited, Baroda* v. *East Indian and other Railways*, the Railway Rates Advisory Committee came to the conclusion that the existing railway rates for medicinal drugs produced in the country were unreasonable and recommended their reduction. The Government of India disagreed with the conclusions of the Rates Committee and did not give effect to their recommendation. While not disputing the force of the technical grounds on which the Government based their decision, the Committee apprehend that, in rejecting the conclusions of the Railway Rates Advisory Committee, the Government did not adequately evaluate the importance of the effect which the reduction of rates will produce on the development of the infant drug industry of this country. We would strongly urge a reconsideration of the question in the light of the circumstances adverted to by us.

296. During the course of the inquiry, we were informed, on several occasions, that the enforcement of strict regulations for the maintenance of the quality of drugs might have an adverse effect on the manufacturing industry in India. It was pointed out that the industry *as such* being only in its infancy, the manufacturers cannot be expected to attain that degree of standard and quality

which world-renowned foreign manufacturers have reached. We are not impressed with this line of reasoning and cannot agree to any lowering of the standard. On the other hand, we fail to see why drugs of standard quality cannot be manufactured in the country, notwithstanding the rigid enforcement of regulations controlling their manufacture.

297. The great difficulty of the manufacturers, as we have already pointed out, is competition with dealers who are importing cheap drugs of low standard and with small manufacturers who are purposely turning out inferior products. It is obvious, therefore, that a control of the quality and strength of drugs sold in India will, more than anything else, go a long way to foster the manufacturing industry here.

298. The drug industry may be classified into four sections:— (1) manufacture of spirituous, galenical and pharmaceutical preparations; (2) extraction of alkaloids, separation of active principles, and production of essential and fixed oils; (3) preparation of organic and inorganic chemicals; (4) preparation of biological products, e.g., sera, vaccines, etc. Closely allied to these is the cultivation, collection and preparation of vegetable drugs which may be regarded as constituting the fifth section. Each of these groups has special difficulties of its own and may be dealt with separately.

299. Most of the factories already established confine themselves, to a large extent, to the manufacture of the preparations referred to in the first section. There seems no reason why practically all the requirements of the country in respect of the drugs comprised in this section should not be manufactured in India. Most of the raw materials are available here and, with help on the lines indicated below, a flourishing drug manufacturing industry can be established.

300. There are great possibilities in regard to the work mentioned in the second section. India is the principal and, in some cases, the only source of many of the crude drugs from which alkaloids, active principles and other valuable substances are extracted. These raw materials are, in many cases, now being exported with the result that the country has, in turn, to depend for its own requirements on imports which involve payment of costs and duty and the profits appropriated by the foreign manufacturers. We have already discussed the possibilities of the introduction of plants not already growing here but for the introduction of which suitable conditions are available.

301. In connexion with the development of the industry mentioned in sections 1 and 2, there are certain difficulties with regard to collection and distribution of crude drugs which greatly handicap the Indian manufacturers. Quite a big difficulty is that, in several cases, the total value of the requirements is so small at present that

the larger and more reliable firms are not interested in their collection. Where the requirements are sufficiently large, there are generally so many middlemen that local market prices become inflated. As a matter of fact, indigenous drugs of a better quality than those obtainable in the local markets have been known to be re-imported at a cheaper rate. To take one example, the collectors of nux-vomica seeds in Orissa receive only Re. 1-4-0 per maund of 105 lb. delivered, washed and dried, at the buyers' godown there. These very seeds are sold at from Rs. 4-8-0 to Rs. 6 per maund in Calcutta which is far in excess of the rate assessable for them with reference to the re-imported finished products made out of the seeds which had been exported from Orissa. The result is that factories producing strychnine in Calcutta have sometimes had to close temporarily. With this heavy price to pay for the seeds, it is impossible to compete with the European manufacturers who get them on terms which work out at far lower rates. The same is the case with caffeine. The price of tea-waste and tea-dust is too high at present for the economic production of caffeine in India. It would appear also that very often the best qualities of certain drugs are exported, and only the inferior and adulterated materials retained for local manufacturers.

302. The consideration of the products referred to in the third section is confronted with many difficulties. The greatest of these is the lack of a well-established chemical industry in the country. This matter is understood to be engaging the attention of the Indian Tariff Board and, if that body succeeds in arriving at a solution, the chemical manufacturers will find a considerable demand for their products from the drug industry. At present, many of these chemicals are required in such small quantities that they can only be satisfactorily produced as a secondary line. Perhaps, to us the most important type of product in this section and the one in which we are mostly interested is the organo-metallic compounds. They can be, and in a few cases are, manufactured in the country; but this, as has already been pointed out, must be permitted only under the strictest control.

303. In the fourth section, we have a class of preparations, the manufacture of which deserves to be encouraged as far as possible. Although climatic conditions offer certain obstacles, a number of firms are, as a matter of fact, preparing them. It must be admitted that the evidence was strongly in favour of Indian-made preparations of this nature and most of the witnesses had satisfactory results from them. The obvious advantages of freshness, of animals living in Indian environment, and of the use of local strains of bacteria have already been discussed. The manufacture of preparations included in this section may be strongly advocated, provided efficient control over quality and standard can be exercised. In this connection the Committee would direct the attention of the Government to the memorandum of Doctor Narayana Menon of the Department of Bio-Chemistry, Medical College, Vizagapatam, which is published

in the appendix. Therein, the possibilities of manufacture of these products have been fully discussed. There is little doubt that these products can be prepared in India, but whether the industry will ever be able to compete successfully with European and American manufacturers is problematical. In those countries, there are large slaughter-houses for all kinds of animals, especially in connexion with meat-preserving concerns, and the carcasses are systematically examined and different parts separated and used in the best manner possible. Nothing is allowed to be wasted. In this way, large quantities of material become available for the preparation of gland products. In India, great difficulties will be experienced in obtaining raw materials on a large scale for the preparation of these particular products. So far as sera and vaccines are concerned, there are, however, no such obstacles in the way.

304. The subject comprised in the fifth section offers special difficulties. Many of the raw drugs are at present collected by ignorant persons and prepared for the market regardless of any special care which may be necessary to prevent the destruction and the decomposition of the active principle for which the drug is required. Further, adulteration is rife, sometimes due to carelessness on the part of the collector, but very often due to fraud. So serious is the state of affairs that, outside India, crude drugs of Indian origin are beginning to be considered unreliable and trade is, in consequence, suffering. *Cannabis indica* has lost much of the reputation it had in European practice on account of the fact that it is not of the same standard and quality as it was in former years. Similarly, the bark of *Holarrhena antidysenterica* has lost its undoubted position as a specific against amœbic dysentery through the substitution of worthless barks; the Indian Aconites are equally unreliable. We are strongly of opinion that steps should be taken promptly to end this state of affairs. Unless and until the practice of adulteration and substitution ceases to exist, the drug industry in this country is bound to suffer grievously.

305. The necessity for a trained personnel for the efficient working of the drug industry cannot be lost sight of. It is obviously impossible to build up an industry unless qualified and experienced men are available. The institution of a degree in Pharmaceutical Chemistry in the Indian Universities has already been pressed by the Committee. As regards imported raw materials, arrangements should be made to ensure that the quality of the material imported is up to the standard. This can be easily done by the Customs laboratories at the port of entry and, in cases of doubt, a sample can always be submitted to the Provincial Laboratory for opinion. The entry of crude drugs, adulterated or inferior in quality, should, on no account, be permitted. With reference to indigenous raw material, control can be exercised over the dealer and manufacturer under the scheme which we have elaborated elsewhere and they can be made responsible for the quality. At present, no attention is paid to the drying and preparing of the drugs for the market.

The intervention of the middleman who frequently adulterates the material cannot also be ignored. It is hoped that adulteration can be effectively counteracted by the enforcement of the provisions which we have outlined in another chapter.

306. A certain amount of speculation also takes place in the drug trade which causes wide fluctuation in prices. Although definite suggestions for protection from such variation in prices cannot be reasonably expected, it might be possible to have a drug market in important centres, such as Calcutta and Bombay, where the crude drugs could be put up for auction and the buyers be given an opportunity of examining samples before purchase. The experience of giving bounties and subsidies to manufacturers, as in the case of steel and other industries, should be considered if a strong case be presented. Any balance of funds, which may be available from those raised for carrying out drug control, may be usefully spent in entirety in furthering the interests of the drug industry in India, in such manner as may be deemed fit by the Governor-General in Council in consultation with the Advisory Board.

307. The consideration of the problem of fostering a drug industry in India has exercised our minds greatly. Its vital importance cannot be overestimated. Its reaction on the supply of medicines of proper strength and quality to the masses at reasonable prices naturally adds to its beneficient effects. Our careful survey of the situation leads us to urge the following recommendations:—

(1) That the Universities in India should be required to give training in advanced pharmaceutical chemistry and institute a degree on the subject.

(2) That the quality of crude drugs, both imported and those grown in the country, should be strictly controlled.

(3) That the import duty on manufactured drugs should be increased by 5 per cent.

(4) That the import duty on crude drugs not available in India should be abolished or appreciably reduced.

(5) That the imposition of export duty on raw materials obtainable only in India should be considered.

(6) That the question of supplying solvents at reduced prices should be seriously examined and that duties on such solvents used, at any rate, for *bona fide* medicinal purposes should be abolished or reduced.

(7) That the restrictions upon the free transit of spirituous preparations between the different provinces in India should be removed.

(8) That the Excise regulations should be modified so as to remove the hardships referred to and they should generally be worked in a sympathetic spirit.

(9) That the question of reduction of railway freights on raw materials and indigenous drugs manufactured in India should be considered.

(10) That the drug industry in India should be encouraged by the Government by the purchase of the required supplies of medicinal preparations, surgical dressings, chemicals, etc., from Indian manufacturers as far as possible.

(11) That the Central Laboratory should be staffed by experts who are capable of giving sound advice to all interested persons on manufacturing processes, the requirements as to machinery and general plant that may be necessary for carrying on the industry, and the technical difficulties which may arise in relation to it.

(12) That every encouragement should be given to promote the cultivation of medicinal plants and herbs.

CHAPTER II

Government Medical Stores Depots

308. Closely allied to the problem of fostering a drug industry in India is the consideration of the policy of the Government in maintaining the Medical Stores Depots in the different Provinces and of the part played by them in manufacturing drugs.

309. The *raison d'être* of Medical Stores Depots, their development, expansion, system of working, methods of obtaining supplies, etc., have been fully dealt with in the memorandum submitted to the Committee by Major E. S. Goss, Assistant Director-General of Stores, which is included in Appendix L of Part II. We will only briefly touch on the points which have evoked criticism.

310. The Government Medical Stores Department was started with the object of ensuring the supply of drugs, instruments, appliances, sundries, etc., both medical and veterinary, of uniform quality and pattern for the Army in India. For this purpose Medical Store Depots were established and maintained in four important centres in India, viz., Madras, Bombay, Calcutta, and Lahore Cantonment, and also one in Rangoon in Burma. Originally, these Depots were nothing more than Stores where medical and surgical equipment obtained from England or from the market in India was stored and issued to the Military Department. The stores obtained from Europe are bought through the Director-General of Stores, India Office, and are purchased at specially reduced and wholesale rates. At first these Depots were under the provincial medical authorities; but after 1894, they came under the direct control of the Director-General, Indian Medical Service, and Army Department. Their sphere of activity gradually became more and more enlarged as not only did the supply of the Army depend on them, but the Civil Medical Departments of the various Provincial Governments also turned to them for supplies owing to

difficulties of obtaining their medical equipment direct from firms in England and elsewhere. Later, many of the non-Government institutions such as the district board and municipal dispensaries, and the Railway Medical Department, and some of the Indian States also asked for permission to use the Medical Stores Depots for the supply of their requirements. The sphere of activity was in this way largely extended, and they began to manufacture not only drugs and their preparations, but also surgical instruments and appliances. It was realized that, as India produced a large amount of raw material, medicinal preparations manufactured from them in the country would be cheaper. The manufacturing was entrusted to the Medical Stores Depots at Bombay and Madras who employed expert pharmaceutical chemists. They, therefore, turned out preparations which were up to the British Pharmacopœia standard at prices very much cheaper than those imported from foreign countries.

311. The Government appear to have fully realized their responsibilities in the matter of not taking up the function of manufacturing drugs which might be left to private firms and individuals. This is evident from the fact that, as early as 1910, a conference of the officers-in-charge of these Depots was held to determine if the Government were getting a fair return for the money spent and whether the policy of manufacturing drugs was right in view of the extension of the drug-manufacturing industry in India. Apparently, the decision was taken to continue the activities of the Stores Depots. It was subsequently proposed that, in the interest of economy and prevention of the locking up of large amounts of money, the stocks kept in the Depots should be considerably reduced; but before this proposal materialized the Great War started and the resources of the Government Stores Department were very heavily taxed in order to supply the various expeditionary forces, which were being sent to different theatres of war, as well as for the equipment of hospitals, ships, ambulance trains, etc. All the resources of the department were fully mobilized and, during 1915 and 1916, the supply of medical and surgical equipment to all the field units was steadily maintained. During 1917, owing to supplies from Europe not forthcoming, the Stores Department utilized all the local resources, as a result of which many drugs and even surgical equipment such as dressings, instruments and appliances were obtained in India and in this way further expansion took place and this continued right up to the end of the Great War in 1918. In 1919, the Afghan War started and these activities had to be maintained for a further period. The expansion of the work of the Depots during all this period is shown by the table to be found in the appendix.

312. Not only did the Medical Stores Department supply all the military requirements during these years but also many hundreds of the civil institutions, both Government and non-Government, who previously had made their own arrangements but,

owing to the war and other reasons, had difficulties in obtaining their medical supplies direct. The quality of the medicinal preparations and other equipment supplied by the Depots was so good that, even after the war, when favourable opportunities were offered for direct buying, those institutions which were not under any obligation to buy their supplies from the Depots stuck to the arrangement. In fact, a large number of other institutions applied for permission to deal with the Medical Stores Depots. This was not surprising as the Indian market had begun to be flooded with adulterated and spurious products, and even supplies from reputable firms were looked upon with suspicion. Besides this, as the department did not aim at making large profits, the supplies were in many instances cheaper.

313. Representatives of manufacturing firms in Calcutta and Bombay protested very strongly against the Government manufacture of tinctures, liquid extracts, etc., as an intrusion into a sphere of activity which does not properly belong to the Government and which, while restricting the market, hindered the growth and expansion of the drug industry in India. Messrs. Smith, Stanistreet and Company, Limited, of Calcutta in their reply to the questionnaire observed:—

> The establishment of the drug-manufacturing laboratories by the Government Medical Stores Department for manufacture and supply of articles, which are manufactured in India, to Government, private and missionary hospitals and dispensaries, railways and other departments, Indian States, etc., is a serious encroachment on our legitimate province. When there was no manufacturing of these products in India the policy of maintaining Government manufacturing laboratories was necessary. It cannot be justified now. The Government Medical Stores should be merely a purchasing and distributing department and should be confined to Army supplies. It is not only an anachronism to-day but a serious and unfair competition to the drug and chemical trade in India and militates against the growth of an efficient and qualified body of drug and medicine manufacturers and vendors in India, without which any legislation for betterment of drug supply in India will be impossible to be carried into practical effect.

314. The Union Drug Company of Calcutta also stated that—

> Every manufacturer is sore at heart for the policy of Government to draw all their medical requisites from the Government Tincture Factories at Madras. Why should that be so? The private firms and incorporated companies should be encouraged to supply medicinal requisites to the State and thereby to better their own position.

315. In their oral evidence, Messrs. Kapilram Vakil and B. D. Amin representing the Indian Merchants' Chamber of Bombay also urged the cessation of Government's manufacturing activities. This raises issues in which interests other than those of the trade concerned are also vitally affected and requires somewhat detailed consideration.

316. The Committee have carefully examined the question of the allegation of unfair competition made with regards to the Medical Stores Department. This competition is said to be chiefly with regard to spirituous preparations such as tinctures, liquid

extracts, etc. We have collected statistics regarding total manufacture of these products in the country so far as was possible and compared them with those produced by the Medical Stores:—

		Approximate quantity manufactured in India.	Quantity manufactured by Government Medical Stores Depots.
(1) Tinctures and Spirituous preparations	...	gals. 1,53,000	gals. 34,000
(2) Liquid extracts	...	„ 24,000	„ 2,600
(3) Solid extracts	...	lbs. 10,000	lbs. 1,200

The figures of total production in India are rather low as we could not obtain statistics regarding tinctures and liquid extracts which are being prepared in small quantities and by dilution of imported concentrated products from certain foreign manufacturers, while the Medical Stores Depots' returns are accurate. Even so, a glance at these figures shows that the Government Stores Department are not great rivals to the drug trade as regards these preparations.

317. A number of other allegations have also been made against the Medical Stores Depots which cannot be entirely substantiated. It has been erroneously said that the Medical Stores Depots obtain duty-free alcohol for the purpose of manufacture, and therefore can sell preparations at lower rates. Another allegation is that the Medical Stores Department get concession rates so far as railway freight is concerned. As a general proposition this is incorrect. The medical stores sent for consumption of the Military Department are subject to a concession rate; this is entirely confined to the Army supply. Such special concessions are given to the Army in many countries not only with regard to railway freights, but in other matters also, and India is not an exception. With regard to the supply to civil institutions, which is really considered by the manufacturers to be the most unfair of their activities, the Medical Stores supply under the same conditions as private manufacturers and give or get no special concession. The prices of the Medical Stores Depots are often above the current market prices and complaints appear to have frequently been received from various institutions on this point. They are calculated on the following basis with a view to do away with the possibility of any unfair competition:—

Local stores.—Actual purchase rate plus 20 per cent on account of departmental charges.

Manufactured stores.—(*a*) Actual cost of raw materials used plus (*b*) cost of labour plus (*c*) 20 per cent on (*a*) plus (*b*) on account of departmental charges.

Imported stores.—(*a*) Invoiced rate plus (*b*) 12½ per cent on account of freight and packing plus (*c*) 15 per cent on (*a*) plus (*b*) on account of customs duty plus (*d*) 20 per cent on (*a*) plus (*b*) plus (*c*) on account of departmental charges.

The pricing is controlled by the Military Finance authorities in conjunction with the Assistant Director-General, Stores.

318. The charge that prices are arranged so that the product is sold just below market rates is probably explained by this system of pricing. It is obvious that any preparation the cost of the material for which is very low will work out at something less than that of a private manufacturer; on the other hand, preparations made from expensive raw materials will be more costly.

319. Another charge laid against the Medical Stores Department is that they do not buy their supplies from local manufacturers. In reply to this the Assistant Director-General (Stores) says: "Every effort is made to obtain articles locally which can be shown to be of a standard equal to those imported as regards quality and price and indigenous materials are purchased locally for use in the factories wherever possible." This is borne out by the fact that the total expenditure for all Depots on imported stores in 1929-30 was Rs. 14,98,520 while that for stores purchased in India amount to Rs. 30,10,390. A list of raw materials used in the manufacture of preparations in the Madras and Bombay Depots, which are purchased locally, is set out in the appendix. The list is quite a comprehensive one and shows that the department is making efforts to obtain all the raw materials that can be possibly obtained in India. The same is true with regard to the manufactured preparations. We were also assured that the Stores Department were even prepared to pay 10 to 15 per cent higher prices for chemicals, etc., which were manufactured by Indian concerns. This should undoubtedly help the Indian chemical industry.

320. A number of witnesses, both medical and pharmaceutical, in different parts of the country alleged that the Medical Stores Depots were in the habit of periodically auctioning deteriorated medicinal drugs and prepartions, surgical dressings, etc., thus liberating worthless drugs and other materials on the market. This point was referred to the Assistant Director-General, Stores, who stated in reply that the auctioning of deteriorated drugs and preparations has certainly not taken place during the last five years. The only exception being that, in September 1927, 492 lb. of chloroform, which had been condemned as unfit for anæsthetic purposes, was sold at a reduced rate, but this was marked as such and was only sold because it could be used as a solvent. It is quite true, surplus stores have been auctioned from time to time and such auctions were frequently held after the war to dispose of large quantities of materials which had accumulated and were no longer required.

321. It is hardly necessary for our purpose to enter into an academic disquisition on the relative merits of private initiative in industry and of nationalization in any scheme of national economy. We are more immediately concerned with the problem of making

India independent of foreign import of drugs with a view to providing for purer medicines at cheaper cost. In view of what has been said, the Committee is not satisfied that the immediate dismantling of the manufacturing plant of the Government Medical Stores, as has been suggested by many witnesses, at the present time, is a means of achieving this object. Besides important military considerations, drugs manufactured in the Medical Stores are obviously indigenous productions, made in India by Indian labour with capital supplied by the Indian tax-payer. This, at present, at any rate, is an insurance against any sudden breakdown of foreign import and a check to profiteering in addition to being a standby in case of war. Failure to procure an adequate supply of drugs of standard quality in the local market forced the Government to undertake the manufacture of drugs and it is yet premature to say that the State enterprise in this direction has outgrown its necessity. Few witnesses have seriously assailed the quality of drugs manufactured at the Medical Stores, which are satisfactorily fulfilling the functions they were intended to perform. The Committee is of opinion that, as the drug industry grows in this country, medicinal drugs of good quality will be produced on a larger scale from raw materials produced here and the Indian manufacturers will be able to successfully compete with the mass production of foreign manufacturers. The cost of medicines will then be considerably reduced and the country will become independent of its present discreditable dependence on foreign countries for its supply of medicines. The manufacturing of tinctures, spirituous preparations, etc., by the Medical Stores Department will then cease *ipso facto* as the Indian manufacturer will be able to supply the Government with good medicinal preparations at a much cheaper rate than they can possibly be manufactured by a Government institution such as the Medical Stores. The Assistant Director-General, Stores, in his memorandum says: "When it is found that an article which has hitherto been prepared in the factories of the Depots can be obtained locally at a more reasonable rate, the preparation of that item is closed down and it is purchased locally . The same applies to imported stores." He also gives a list of articles of stores which have been imported but have now been placed on the local list.

322. While unable to agree to the immediate abolition of the manufacturing activities of the Medical Stores, we would draw the attention of the Government to a certain feature of the organization which cannot legitimately escape criticism. Mr. Vakil of the Indian Merchants' Chamber, Bombay, in his oral evidence pointed out that the system of accounts in the Medical Stores was not on commercial basis, that in fixing prices no allowance was made for interest charges on capital, for depreciation; sometimes the rent of the building was excluded; and, in fact, the method of calculating cost was arbitrary. We recognize the force of this argument. The exact financial position of a manufacturing undertaking cannot be properly estimated and its profit and loss position

cannot be reliably ascertained unless the accounts are commercialized. In 1919, the Lovet Committee on the Reorganization of Medical Services in India stated in their report that in dealing with drugs the question of quality was so important that Government should not discontinue any manufacture until reliable commercial firms had proved that they could manufacture drugs of necessary quality on a sufficiently large scale as to render it absolutely certain that Government would be able to obtain all its requirements without difficulty and at prices comparing favourably with the Government cost production. Twelve years have elapsed since the report, and the manufacturers in India protest their ability to supply drugs of requisite quantity and quality, at any rate so far as the supply of tinctures, extracts, etc., are concerned. But unless the accounts of the Medical Stores are commercialized, the basis of comparison between the Government cost of production and that of the private manufacturers will be wanting. Comparison between prices based on departmental system of accounts and the commercial will lead to no useful results. We recommend that the Director of Commercial Audit undertakes the introduction of commercial system of accounts in the Medical Stores and, after the introduction of such a system, if it is found more economical to purchase in the local market, that will be the time to consider the question of abolishing the manufacturing activities of the Medical Stores.

323. The conclusions which we have reached after carefully considering the evidence may be summarized as follows:—

(1) Although we agree with the principle that the Government should not compete with private concerns manufacturing medicinal preparations, we are of opinion that, in the present state of the drugs on the Indian market and the present condition of drug manufacture in this country, the immediate cessation of this activity will not be advisable in the interest of economy and efficiency.

(2) As local manufacturing progresses and good quality drugs are obtainable on the Indian market at a cheaper rate the manufacturing should be gradually reduced till it is stopped.

(3) The Committee feel that the charge of unfair competition levelled against the Government Medical Stores Depots has been somewhat exaggerated.

(4) The Committee are of opinion that as the drug industry grows the Medical Stores Depots should gradually remove from their list such medical institutions as are not definitely entitled to obtain supplies from the Depots, viz., district board and municipal hospitals, railway institutions, Indian States, etc.

(5) Supplies for the Stores Depots should be obtained, as far as possible, from local manufacturers.

SECTION V

A Pharmacopœia for India

324. The object of a Pharmacopœia is, in the words of the founders of the United States Pharmacopœia, 1820, "to select from among substances which have medicinal power those the utility of which is most fully established and best understood, and to form from them preparations and compositions in which their powers may be exerted to the greatest advantage."

325. How far it is possible to stray from this ideal may also be stated in the language of H. C. Wood, President of the United States Pharmacopœial Convention, thus:—"A common, fallacious belief is that Pharmacopœia recognition means that the drug recognized is of value; the fact is that the United States and other Pharmacopœias have in them numerous drugs of very little use. The nature or *motif*, so to speak, of a Pharmacopœia is not to distinguish between worthy and worthless drugs, but to see that a drug which is asked for is, as sold by the apothecary, pure, and that proper preparations of uniform strength are made by the apothecary." "The question which the framers of a pharmacopœia ask themselves is not, is this drug of value, but is there a demand for it by the profession of medicine? If five thousand doctors in the United States believed brick-dust to be a valuable remedy and habitually used it, brick-dust would have to go into the Pharmacopœia. Witch-hazel is probably as active and as useful as is brick-dust, but witch-hazel is a fad and is enormously called for, and so witch-hazel must go into the pharmacopœia. The Pharmacopœia exists for the purpose of requiring the apothecary to give, in the first place, pure brick-dust or pure witch-hazel when asked for, and, in the second place, uniform preparations of these remedies."

326. The truth is that, as a national Pharmacopœia is primarily meant to meet the claims and satisfy the needs of a particular group of physicians at a particular time, there must exist, and there exists, a great difference not only between Pharmacopœias of various countries, but also between various editions of the same Pharmacopœia.

327. The bare facts show a great difference between ancient and modern pharmacopœias, but a little consideration of the material clearly indicates a close resemblance between the drugs listed in the two, with this difference that scientific methods of standardization have developed and have been gradually introduced. Where powdered aconite root was used by the old physician, to-day we have a standard tincture with a biological assay. The unstandardized powdered drugs such as nux-vomica, datura, cinchona,

etc., are replaced by pure organic compounds, the alkaloids, or a galenical preparation with chemical assay for a content of a standard amount of active principles.

328. The modern pharmacopœia is thus above all a book of standards. Its fundamental object and scope is, as expressed in the United States Pharmacopœia, " to provide standards for the drugs and medicines of therapeutic usefulness or pharmaceutic necessity sufficiently used in medical practice; to lay down tests for the identity, quality, and purity; to insure, as far as possible, uniformity in physical properties and active constituents." In other words, usage, rational usage and scientific usage are the basis of judgment. And despite the fact that there may, and of necessity always will, be certain minor imperfections, in the Pharmacopœia, it is and will remain the leading standard; and no one questions the imperative need of such a standard. Whenever a ' pure drug bill ' is proposed it is assumed almost as a matter of course, that the Pharmacopœia is to be the standard by which the quality of drugs is to be judged.

329. The need of such a standard for drugs intended for the use of physicians is all the more evident when it is remembered that some manufacturers who do make standard pharmacopœial preparations nevertheless frankly admit that they put upon the market other preparations of the same substance by no means of pharmacopœial standard, but under the names almost identical with the pharmacopœial names. These manufacturers claim that, when the official article is not specifically designated, popular demand and commercial competition justify this procedure. The possible dangers in such a course must at once be apparent, and this practice is one of the reasons for the legal requirement that any article sold under a pharmacopœial name must conform to pharmacopœial standards.

330. The pharmacopœia is, moreover, the chief bulwark of one of the most time-honoured principles of the medical profession, namely, that there must be no secrets about the drugs used in the treatment of disease. Upon this question, that physicians must have full knowledge of all the constituents and of all the properties of the drugs they prescribe, there can be no compromise. The physician should never forget that he is the sole judge of what is suitable for his patient.

331. In almost all of the countries, the national pharmacopœia is produced either under the direct supervision of one of the departments of State or by a committee appointed by the Government for the purpose. The noteworthy exceptions are the United States of America and Great Britain. In the former, it is not produced under direct Government authority, but is accepted by the Government as a standard after its publication. In the latter it is entrusted to the General Medical Council, who, in turn, hand over the work to a Pharmacopœia Committee.

332. Brief summaries of the practices in the principal countries are set out below:—

Belgium.—The Pharmacopœia is published by the Government. The Pharmacopœia Commission of nine members appointed for a period of three years is a permanent commission and is at present composed of six Pharmacists, and three Doctors of Medicine; its work is not continuous. There is no statutory requirement of the intervals between editions, although a Royal Decree provides for the publication of a supplement every three years, but does not make it compulsory. The last edition, the third, was published in 1906; and a supplement was issued in 1912. The fourth edition is in the press.

333. *China.*—In 1929, the Acting Minister of Health invited a committee of four to draw up the first draft of the Chinese Pharmacopœia. This, in spite of continued political unrest, was finally adopted at the second annual conference of the Board of Health of the Nanking Government held in February 1930.

334. *Czechoslovakia.*—The Pharmacopœia is prepared by a commission divided into four sections—chemistry, pharmacology, galenical pharmacy, and serology and bacteriology. It has 42 members—21 pharmacists, 4 professors of chemistry, 4 professors of botany, 10 professors in the Faculty of Medicine, 2 professors in the Polytechnic, 1 professor in the Veterinary High School—, and 2 barristers. The first edition is in the press.

335. *France.*—The Pharmacopœia is published by the Government, which nominates a committee to prepare it. The committee responsible for preparing the last edition (1908) was composed of sixteen members, ten of whom were pharmacists. In 1926, a permanent laboratory for the Pharmacopœia Committee was established, the work having been previously carried on in the laboratories of members of the committee. New editions of the Pharmacopœia appear irregularly; since 1908 four supplements have been published, the last in 1925.

336. *Germany.*—The editing of the German Pharmacopœia is in the hands of the Imperial Board of Health working in collaboration with a Committee of the Imperial Health Senate. Experimental, chemical, pharmacological, and pharmocognostical researches are undertaken by workers in their special branches in the laboratories of the Imperial Board of Health. Editions are generally published at intervals of ten years, and as the work is continuous a supplement to the existing work could be produced at short notice, if required. The last edition, the sixth, was published in 1926.

337. *Italy.*—The Pharmacopœia is revised by a Government commission composed of 4 physicians, 4 pharmacists, 1 veterinary surgeon, 2 botanists, 3 pharmacologists, 1 physiologist, and 7 chemists selected from the Professors of Pharmaceutical Chemistry of the Royal Universities. Research work is not continuous; but it is proposed to make the commission a permanent one. The

Pharmacy Act of May 1913 requires the revision of the pharmacopœia to be undertaken every five years. The last edition, the fifth, was published in 1929.

338. *Portugal.*—The Pharmacopœia, published in 1876, was prepared by a Commission of eleven members appointed by a Royal Decree of the 15th of November 1871. The Commission consisted of 3 physicians, 6 pharmacists, and 2 chemists.

339. *Switzerland.*—The compilation of the Pharmacopœia is entrusted by the Federal Council to a commission constituted as follows: 3 professors of pharmacognosy and pharmaceutical chemistry, 1 professor of pharmacology, 3 physicians (including the Director and Assistant Director of the Health Department), and 6 pharmacists (including the Military Pharmacist). The Commission is divided into sub-commissions for chemistry, drugs and galenicals. At present there is no permanent Pharmacopœia Commission. There is no prescribed interval between the editions, the revision being conducted as required. The last edition, the fourth, was published in 1907.

340. *Turkey.*—In 1926, under the direction of the Ministry of Hygiene, a special committee of fifteen members was appointed to prepare the Turkish Pharmaceutical Codex. The budget of the Ministry is to provide for a fixed remuneration to every member of the committee. The committee is to meet every five years to discuss modifications and prepare supplements to the Codex. The Codex came into force in the beginning of 1929.

341. *The United States of America.*—The Pharmacopœia is revised by a committee of 51, the publication and business details being controlled by a board of trustees. The Pharmacopœia is accepted by the Government as a standard for drugs and medicines under the Food and Drugs Act. The Committee of Revision consists of 15 clinical physicians, 2 serologists, 4 pharmacologists, 11 pharmacists, 15 pharmaceutical chemists, and 4 botanists. The Committee of Revision has no laboratory for research, but depends upon the co-operation of the laboratories of the Government, of the Universities and colleges, of industrial organizations having research departments and of private persons. Continuous research work is thus undertaken and a Pharmacopœia is usually published every ten years.

The work of the United States Pharmacopœial Convention is based upon the reports of fifteen sub-committees who deal with the scope (admissions and deletions), therapeutics and pharmacodynamics (posology) biological assays, biological products and diagnostical tests, botany and pharmacognosy, proximate assays, inorganic chemicals, organic chemicals, reagents and test solutions, volatile oils, extracts, fluid extracts and tinctures, water solutions, spirits, syrups and elixirs, cerates, ointments and miscellaneous galenicals, tables, weights and measures, and nomenclature.

342. *Great Britain.*—Former editions of the British Pharmacopœia have been produced by a committee of medical practitioners appointed by the General Medical Council, to which body the preparation of the book is entrusted by law. The Pharmacopœia Committee has appointed Committees of Reference in Pharmacy, and expert referees in other subjects; but there has been no organized continuous research work in the intervals between editions. The last edition appeared in 1914; but a new one is in preparation and work has been going on continuously since 1921.

In 1925, the Pharmacopœia Committee of the General Medical Council was able to recommend that the necessary steps should be taken towards the issue of a new edition of the British Pharmacopœia. Dr. Philip Hamill, lecturer on Pharmacy and Therapeutics at St. Bartholomew's Hospital; was appointed as secretary to assist in the work, and, as a result of inquiries and representations, it was thought advisable to convene a conference on February 23, 1926, to which invitations were issued to various medical, pharmaceutical, and scientific bodies of the Kingdom.

The Committee, having sifted all the evidence, drew up certain recommendations which should be carried out in future British Pharmacopœias and these may be summarized as follows:—

(1) That it is not necessary to make any alterations in the existing laws relating to the preparation or publication of the British Pharmacopœia.

(2) That the General Medical Council should set up forthwith a Selection Committee for the purpose of nominating a new body known as the Pharmacopœial Commission. The Selection Committee to consist of 4 members nominated by the General Medical Council, 3 nominated by the Pharmaceutical Societies of Great Britain, Ireland, and Northern Ireland respectively and 2 nominated by the Medical Research Council.

(3) That the Pharmacopœial Commission should consist of selected authorities in various departments, but that its members should not be restricted, and that from time to time permanent or temporary members should be appointed as circumstances arise including representatives of India and of the Dominions.

(4) That the Commission should be a permanent body, with an office and secretariat.

(5) That the completed volume should be submitted to the General Medical Council for approval before publication.

(6) That in future the British Pharmacopœia (*a*) should be revised and re-issued at stated intervals of ten years, supplements being issued as required, and (*b*) should contain only standard drugs in general use throughout the Empire.

(7) That where it is desired in any part of the Empire to sanction the use of particular local drugs, or alternative preparations not included in the British Pharmacopœia, this should be effected by the Governments concerned by the issue of local supplements or addenda.

(8) That the Governments of the Dominions and India should be asked to set up their own committees to assist and co-operate with the Pharmacopœia Commission.

(9) That, until the financial results of the next edition are seen, the funds necessary for carrying on the work of the Pharmacopœia Commission be provided by the General Medical Council.

343. The Committee set up in India to co-operate with the Pharmacopœia Commission in the revision of the British Pharmacopœia was formed on the 28th February 1929 and consists of—

(1) The Director-General, Indian Medical Service—Chairman.

(2) Lieut.-Col. R. N. Chopra, M.D., I.M.S., Professor of Pharmacology, School of Tropical Medicine and Hygiene, Calcutta —Member

(3) Reverend Father J. F. Caius, F.L.S., M.S.C.I. (Paris), S.J., Officer in charge, Pharmacological Laboratory, Haffkine Institute, Parel, Bombay—Member.

(4) The Assistant Director-General, Indian Medical Service (Stores)—Secretary.

344. Among other existing Pharmacopœias may be mentioned those of Denmark, seventh edition 1907; Holland, fifth edition 1926; Hungary, third edition 1909; Japan, fourth edition 1921; Norway, fourth edition 1913; Russia, seventh edition 1929; Spain, eighth edition 1930 and Sweden, tenth edition 1925.

345. It is obvious that the making of a pharmacopœia is not just an editorial matter. To apply it as a reality bringing law and order to a chaotic medical world needs guidance and continued promotion by the best scientific men in the country.

346. It is equally obvious from the evidence placed before this Committee that India should have an official publication which would record what she recognizes as a trustworthy and approved *materia medica* upon which can be established modern food and drug Acts, poison laws, systems of taxation, and the modernization of legal medicine. Her best scientific men should be enlisted to shoulder the responsibility of working out India's own standards and to develop the necessary analytical laboratories, biological institutes and pharmaceutical schools. It involves not only the development of machinery for the administration of laws based upon official standards, it means also finding an authoritative standard which every doctor and pharmacist in India will hail as a real guide in every day work.

347. That the one great desire of the medical profession in India was to have a pharmacopœia of their own became apparent from the very first stage in the enquiry. A circular letter was accordingly issued by the Committee with a view to ascertain the general feeling on the subject. A copy of the circular letter is given in the

appendix together with the answers to it. All told, 235 witnesses have, either orally or by writing, expressed an opinion on the suitability or otherwise of compiling an Indian Pharmacopœia. While 202 are emphatically in favour, four are no less categorically against. The other 29 think that an Indian Addendum to the British Pharmacopœia would meet their requirements.

348. We need not give here a detailed analysis of the answers, as the *pros* and *cons* may be aptly summarized in the words of Major-General C. A. Sprawson, Surgeon-General with the Government of Madras:—

"Of the alternatives put forward by Colonel Chopra, viz., the compilation of an Indian Pharmacopœia or the adoption, presumably after adaptation, of the existing Pharmacopœia of another country, my preference is for the former for the following reasons:—

(1) The making of an Indian Pharmacopœia seems inevitable some day. The present use of the British Pharmacopœia with an Indian Addendum is a little cumbrous, and does not bring into correct perspective those Indian drugs that are already admitted to pharmacopœial status.

(2) Other Indian drugs may be found worthy of admission and will obtain admission more readily if submitted to a committee actually in India.

(3) It may be found that India alone could introduce metric measures in its pharmacopœia to the exclusion of other measures more readily than it could do if it adopted the Pharmacopœia of another country.

Against the making of an Indian Pharmacopœia may be urged—

(1) The expense.

(2) The labour of a committee sitting for a prolonged period at the start and sitting again at various intervals to keep the Pharmacopœia up to date.

(3) The consideration that all doctors and pharmacists in India are at present trained in the British Pharmacopœia with Indian Addenda, and a new introduction will entail some dislocation.

(4) The consideration that India, has not in such abundance the pharmacological plant necessary for drug standardization, and that the leading druggist firms in India are either British or American and, therefore, the carrying out of the work necessary for the maintenance of pharmacopœial standards will be both more difficult and more expensive.

In spite of these objections I favour the formation of an Indian Pharmacopœia."

349. Many of the witnesses who appeared before the committee suggested that drugs and preparations used in the indigenous systems of treatment should form a part of the Indian Pharmacopœia. It was urged that this work should be divided into two parts, Part I dealing with drugs and preparations used in the Western Medicine and Part II with those used in the indigenous systems of treatment. That such a scheme will not be possible is evident from the fact that the Indian Pharmacopœia will include only therapeutically active substances of known composition, of definite pharmacological action, of well-established therapeutic use, and of which the toxicity has been fully worked out. It is also necessary that standards for determining the safe maximum dose with chemical and biological methods of assays should be known. Only such

drugs of the indigenous systems which satisfy these standards can be included in the Indian Pharmacopœia. The large mass which do not satisfy these conditions should be left entirely alone. The desirability of having a pharmacopœia of the indigenous systems of treatment is a question which should be left to be dealt with by the practitioners in these systems.

350. The Pharmacopœia which we have in view ought to include the therapeutically active substances and, to find admission to it, a drug must be of known composition, of definite pharmacological action, and of well-established therapeutic use, and fully investigated for its toxicity and necessary standard for determining a safe maximum dose, with a chemical or biological standard.

351. Necessary tests have to be developed for the protection of doctor, pharmacist, and patient. India ought to set a standard of strength and purity for the material which is to appear on her markets. Chemical industries would need the most rigid control to keep the country from being flooded with salts containing relatively large amount of arsenic or lead made from the inferior grades of acid. It is doubtful whether the high European standard for bleaching powder can be maintained in India; if so, what standard should be adopted? Will the hydrated salt of calcium chloride containing two molecules of water, or the desiccated salt, or that containing six molecules of water be best suited to the Indian climate? Up till now, scarcely any institution in India has chosen to make simple tests for melting point, solubility, etc., for want of definite national standards.

352. The organic chemist has a wide field of work. Samples of drugs show that deplorable chaos exists among the crude materials which commonly occur on the Indian market. Very few, if any, have been standardized botanically, pharmacognostically, or chemically, and the standards applying to foreign material do not necessarily apply to Indian material. Besides the detailed tests and assays which need being worked out very carefully, quick methods of identification are needed.

353. It is well known that long transport and storage are apt to lessen the potency of numerous preparations; hence the need of methods for the biological assay of drugs. But this supposes that the materials used for conducting the assays have been first satisfactorily standardized. Lacking reliable information concerning the frogs in India, or of reliable data of tests made upon them for digitalis, the cat method of assay has to be adopted; how far is that method to be depended upon? There is no pure breed of cock for the old cock's comb method of ergot assay; should Broom and Clark's method of using isolated strips of virgin rabbit uterus be adopted? There is much work to be done by the pharmacologist in conjunction with the biologist and physiologist in making these tests satisfactory.

354. *Inter alia* (1) the standard of strength and quality of the vaccines and sera, (2) the tests to be made, and (3) the units of

standardization to be adopted have to be decided. What can be done to guarantee the products used to-day, chiefly from abroad, in the treatment of pneumonia, tuberculosis, etc.? This is such a specialized field that one or two experienced men should stand as a final authority for the material used in India.

355. Temperature and climate have a lot to do with the details of galenical processes. The hardness of an ointment, the amount of sugar in syrups, the percentage of alcohol used, all need careful adjustment. In this vast country with such ranging degrees of longitude and latitude much local adaptation is needed.

356. India has such a fine old *materia medica* of her own that quite a number of the drugs used by the old school should receive attention. A goodly number of these are identical in botanical origin with Western drugs, but the preparation of the crude material may not in all cases correspond with the standards laid down elsewhere. Other drugs may be chosen in order to give preference to a native species or a local product which will be more convenient to obtain and more readily understood by the country at large. But it may be stated that India has only few men trained in the subjects of pharmacognosy, field botany, and plant analysis.

357. It may be added that nearly 30 per cent of the witnesses desire that the compilation of an Indian Pharmacopœia should be undertaken immediately without waiting for the formation of a General Medical Council for India. It is, therefore, the ardent desire of the medical and pharmaceutical professions in India that the Government should make every effort to bring immediately into being the necessary machinery for the legal administration of the highest standards, the chemical laboratories for testing drugs upon the market, and the biological institutes for standardizing drugs.

358. Many of the witnesses have come forward with valuable suggestions, some of them practical. The only difficulty is that none could be put into practical operation at once. The simplest of the schemes proposed will require years of intensive and uninterrupted labour by expert scientists working in unison with ample funds at their disposal—conditions which do not obtain in India and which, for want of a properly organized responsible body, may not obtain for many years to come. Even admitting that the proposed Indian Medical Council should come into existence in the near future with sufficient funds to draw upon, it would take time to find the men capable of forming an Indian Pharmacopœial Board and still more time to group them into an efficient working body.

359. The committee has given careful thought to this question of the compilation of an Indian Pharmacopœia and considers that the utility of such a work for the country cannot be overrated. Apart from the fact that there is an almost universal demand from the witnesses, both physicians and pharmacists, the preparation has

cogent scientific reasons to favour it. The methods of therapy vary in different countries. The raw materials from which medicinal drugs are prepared do not possess the same qualities and may not be available so readily in one part as in another. The altitude, the season, the climatic conditions, the time of collection, etc., are some of the important factors determining the activity of medicinal plants; a plant showing remarkable activity in one part of the world may be inactive when collected from another. The bark, root, leaves, etc., vary in their active constituents, and what is used in one country may not be suitable for another. Again, there are racial variations in dosage. What is an effective dose for a European may not be so for an African. We have already referred to the effect which the climatic conditions have on the pharmaceutical processes. The unsuitability of the Pharmacopœia of one country for another is therefore obvious. Each country should evolve a pharmacopœia best suited to its own peculiar climatic and racial factors with due regard to the raw materials available.

360. In recent years, there has been a proposal towards internationalization of pharmacopœias. Attempts have been made in pharmaceutical and medical conferences to find a basis on which an international pharmacopœia could be prepared. Already some progress has been made and, so far as potent remedies are concerned, uniformity in dosage has been established in almost every pharmacopœia in the world. However, a great deal of confusion exists with regard to galenicals. While admitting the advantages of an international pharmacopœia, the committee is nevertheless of the opinion that it cannot entirely displace the national pharmacopœias.

361. As regards the actual compilation of an Indian Pharmacopœia, we have already referred to the delay which may result if the work is to be entrusted to the General Medical Council in India when it comes into existence. Our colleague, Reverend Father Caius, has of late years given a good deal of attention to this problem, and has formulated a scheme the details of which are given in the appendix. We commend this scheme for the consideration of the Government as being a quick method of tackling the problem. We are informed that if the facilities asked for are given the workers of the Pharmacological Laboratory at Parel in Bombay will take up this work and complete it in a couple of years.

362. The first edition of the Pharmacopœia thus compiled will serve as the basis of work to be carried on later by the Indian Pharmacopœial Committee permanently appointed either by the General Medical Council or by the Government. It will be the duty of that committee to deal with the volume of criticism of the first edition, to rectify any errors or defects, to readjust certain things to local needs, to pass on new drugs and new tests, and to keep abreast with modern medicine. Unless this or similar action is taken, India will be able merely to copy foreign standards and, failing to continue to develop her own uniform standards, much the same conditions will prevail as existed prior to the preparation of an Indian Pharmacopœia.

363. The committee recommend that—

(1) Steps should be taken to compile an Indian Pharmacopœia without delay.

(2) This work should be on the lines of the British and United States Pharmacopœias including only drugs of known composition, of definite pharmacological action, of well-established therapeutic properties, with the toxicity fully worked out and the necessary standards of chemical and biological assay for determining the safe maximum doses.

(3) The draft should be compiled on the model of existing pharmacopœias, and should contain (1) such of the therapeutically active substances and pharmaceutical necessities as are found suitable for India, and (2) substitutes and additions from the indigenous *materia medica*.

(4) The desirability of entrusting the work of compiling the Indian Pharmacopœia to the officers of the Pharmacological Laboratory, Parel, Bombay, may be considered

SECTION VI

Quinine Policy

364. The policy of the Government of India with regard to the working of the Cinchona Department and quinine production was called into question by a number of witnesses. We are fully aware of the volume of literature that has gathered round this subject. At the same time, we realise how intimately the subject of the production and price of quinine is related to its adulteration in India. We, therefore, feel justified in dealing with the subject at some length.

365. That quinine is one of the most needed drugs from the point of view of the Indian public is obvious from the fact that it is used in the prophylaxis and treatment of malaria, the most widespread disease in the country. The high incidence of this malady is sufficient ground for a demand for an adequate supply of this valuable drug. It has been estimated that there are in India 100,000,000 untreated sufferers from malaria and a little over 8,000,000 receiving complete or partial treatment. These figures, though not necessarily accurate, are, however, sufficient to show to what an extent the people suffer from that disease. In addition to the high mortality there is the incapacity to individuals, both temporary and permanent. The economic loss and the consequent penalty, which has to be paid by the country as a whole, is tremendous. Figures have not been worked out for India but, according to Andrew Balfour's estimation, the direct loss sustained by the British Empire due to sickness and death caused by malaria amounted to between £52,000,000 and £62,000,000 annually. The share of India might easily be over a half of these amounts.

366. In view of these facts, it will be of interest to see what the consumption of quinine in India per head is, as compared with other countries in which a high incidence of malaria occurs. In Italy the consumption is 16 grains per head, in Greece 24 grains, whereas in India it is only 3½ grains. The figures for some of the highly malarious provinces in India show even a lower rate of consumption. For instance, if we examine the different divisions of the Bengal Presidency, which is perhaps the most heavily infected area, the consumption per head in Burdwan is 1·07 grains, the Presidency division 1·31 grains, Rajashahi 1·07 grains, Dacca 1·50 grains, and Chittagong 2·6 grains. These figures speak for themselves and show how inadequate the supply of quinine in this country is!

367. The next question, which arises for consideration, is "What is the quantity of quinine actually required from the

point of view of public health in India?" The Bombay Medical Union states:

> If each case is treated with 110 grains of quinine, which may be taken as a minimum for the cure of each paroxysm, the demand for hospital and dispensary treatment alone would be 125,000 lb. a year. Patients do not get as much as they ought to because the cost of quinine is prohibitive. It is estimated that there are 100,000,000 sufferers from malaria who do not attend the hospitals. The potential demand is, therefore, somewhere between 125,000 lb. and 1,500,000 lb. When, in 1903, the Italian Government made quinine a State industry and cheapened its retail price, consumption in that country enormously increased and malaria mortality was reduced from 15,000 to 3,000 a year.

368. The Public Health Commissioner with the Government of India says in a recent report:—

> It may be said that there is no question of the effective treatment of malaria in India until the consumption of quinine approximates to 500,000 lb.

369. Sir Patrick Hehir has estimated that for India 970,000 lb. of quinine would be the minimum amount required to have effect on the malaria problem. The Royal Commission on Agriculture was also of the opinion that both for the prevention and the treatment of malaria a much wider distribution of quinine is necessary (paragraph 411 of the Report). According to Dr. Charles Bentley, Director of Public Health in Bengal, 100,000 lb. of quinine must be consumed annually in that province alone before any appreciable effect will be shown.

370. The estimated figures for the requirements of the country produced from different sources may vary considerably but all alike demonstrate one point, viz., the hopeless insufficiency of the present supplies of quinine. What is the exact extent of these supplies and what are the sources from which they are derived? The annual consumption of quinine in India at present is nearly 200,000 lb. derived from two sources:—

(*a*) There are in India two State owned cinchona plantations with factories for the production of quinine. One of the plantations is situated at Mungpoo in the Darjeeling district in Bengal, and the other at Naduvattam, near Ootacamund in the Nilgiris. Besides these there are also plantations in Burma. There were a number of privately owned plantations in the Nilgiris, but these have dwindled during recent years to almost nothing, as is evident from the following remarks occurring in a memorandum by Mr. C. C. Calder, Superintendent, Cinchona Cultivation in Bengal:—

> Private Indian grown bark, once fairly plentiful, may be said to be a rarity now on the markets. When it appears, it is absorbed at prices below world rates because of its inferior quality.

(*b*) As the combined production of quinine by the two factories does not exceed 70,000 lb. annually, large quantities of this drug have to be imported.

The following table shows the amount of quinine derived from the two sources, i.e., manufactured in India and imported into India:—

Year.		Mungpoo.	Madras.	Imported.	Total.
1927-28	...	(46,844	21,688)	113,637	182,169
		68,532			
1928-29	...	(41,368	23,065)	133,795	198,228
		64,433			
1929-30	...	44,140	...	...	...

371. The reason for the small production of quinine in India is not due to export of large quantities of the bark as alleged by some of the witnesses. Dr. K. S. Ray stated in his memorandum that "India exports, on the average, 6,000,000 lb. of the bark annually. Shipments are made from Southern India (vide Handbook of Commercial Information for India, compiled by C. W. E. Cotton, I.C.S., for Government of India, page 316)." In view of the small output of the Indian factories, which are at present not working to their full capacity, and having regard to the fact that large quantities of the bark are imported to feed these factories, this statement surprised us considerably. We therefore wanted to verify the figures. Mr. A. Wilson, Deputy Director of Agriculture (Cinchona), Ootacamund, in his reply, dated the 4th March says:—

I do not know where you got the figure of Indian export of bark. I buy everything on offer on Government account and it is only rubbish, which is of no use for quinine manufacture, which is ordinarily exported. I doubt if there is as much as 50,000 lb. exported annually, for practically all cinchona plantations are worked out.

372. A similar reply was received from the Bengal plantation at Mungpoo. It would appear from this that whatever may have been the case in the past, the quantity of the bark exported *at present* is negligible.

373. The reason for the low production of quinine in India is the small area under cinchona cultivation. The following table gives the figures for the two plantations:—

	ACS.	
Mungpoo (Bengal) ...	2,877·3	Actually under plantation, though the total area is much bigger.
Naduvattam (Madras).	2,035	

374. The species of cinchona grown in the Bengal and Naduvattam plantations are *C. ledgeriana, C. succirubra,* and a hybrid of these two species, *C. robusta*. This undoubtedly is a very small quantity for the needs of such a large country as India, and the general trend of evidence before the Committee was that much more could be done by the Government to produce quinine in India on a much larger scale and to cheapen its price. Mr. C. C. Calder, the Superintendent, Cinchona Cultivation of Bengal, who was addressed on this question says:—

What this boils down to is the production of the bark. In my opinion, much more of this could be produced. But it is a question of finance and,

so far as bark production is concerned, knowledge and experience; and, linked with the problem of bark production, is the equally large and difficult problem of financing consumption of quinine.

375. There are, however, difficulties in the way of production of the particular bark suited for the extraction of quinine. We will refer to this aspect of the question later.

376. A great deal of attention was directed to matters pertaining to cinchona in India in the evidence given before the Royal Commission on Agriculture. Eminent witnesses including Sir David Prain and Colonel (now Major-General) Graham, emphasized particularly the need for taking active steps for increasing the area under cinchona cultivation. The question of its centralization was also brought forward. The evidence showed that for many years there has been comparatively little advance in the extension of cinchona cultivation in India, although large tracts suitable for such plantations are available. The question of centralization had also been considered some years ago and the decision arrived at was that neither complete centralization nor provincialization was possible. The Royal Commission on Agriculture fully comprehended the importance of a sufficient supply of quinine to the public and made far-reaching recommendations in that direction. Influenced by the urgent need for its development, the Commission also recommended that the subject should be made central. Irrespective of the manner in which the Provincial Governments producing quinine had carried out their obligations in the past, this was considered essential. The imperative need for quinine has been generally felt in all Provinces and, as it can only be produced in a few, its production and distribution are properly the function of the Central Government. This was the view which was accepted by the Commission and which it urged for the consideration of the Government. Even with all this force of opinion behind it, the internal quinine difficulties of India have not been solved. During the meeting of the Agricultural Conference in Simla in 1928, a Committee of representatives of different Provincial Governments concerned in cinchona plantation was convened with a view to advising the Government how far and in what direction the recommendations of the Royal Commission could be carried out. While examining the position, the Committee was at once brought face to face with the financial aspects of the problem of stocks, and its advice reflects the difficulty of finding a *via media* between the modern tendency to estimate all values in terms of cash and the older philanthropic object with which the Cinchona Department was originally started. The Committee recommended a scheme by which all profits which might accrue would be equally shared by all users of quinine, and appealed for co-operation in the larger interests of public health. Nothing of practical value resulted from the discussions which took place, the financial consideration apparently outweighing the interests of public health. Even the visit of the Malaria Commission of the League of Nations, who put quinine and its proper use in the forefront of the methods of attacking this disease, did not help very much to further the interests of quinine production in this country and its distribution to the masses.

377. The foregoing discussion regarding causes of the backward condition of cinchona plantation will show why the country has to be dependent upon foreign sources of supply for which she has to pay very heavily, and why it has to submit to foreign domination regarding the fixation of the price of quinine. It is common knowledge that the world-price of quinine is controlled by a powerful Syndicate known as the 'Kina Bureau.' Although from time to time many quinine factories have tried to become independent, they have always ended up by being subjugated. Even in 1928 many of the quinine dealers attempted to break away from the official prices determined by the Kina Bureau. It was for this reason that it became possible at that time to get supplies of quinine in the open market at rates below those officially sanctioned, and by avenues different from those by which they used to reach the retailer. The result was that many old, established and reputable firms who carried on big business and who would not sell under the agreed price suffered losses and accumulated large stocks. This might suggest overproduction of quinine in the world; and yet, one knows that India alone could consume the whole of the world's annual production, if the prices were within the means of the masses, or if the Government undertook a distribution of quinine commensurate with the needs of the population. The 'Kina Bureau' has, however, triumphed and has been successful in effecting regulated and gradual reduction of cinchona areas to proportions fitted to what the world can afford to buy and not what it really needs. In this way the price would be maintained at a level that would leave a profit both for the plantations and the factories.

378. It follows from all this that it would be absolutely futile to expect any large reduction in the price of quinine under the present conditions. So powerful is the organization known as Kina Bureau, and so efficient is the entire arrangement that even the great world-wide depression during recent years has not affected the prices of quinine and they still remain at Rs. 18 per pound which was the price fixed so long ago as 1926. This, in spite of the fact that it is being produced in quantity in excess of the world's actual demand though the actual stocks are still well below the world's real requirements. This is the result of production and sale under control.

379. The Cinchona Department, no doubt, is congratulating itself for not being affected by the depression on account of agreement with the Kina Bureau, but from the point of view of the health of the people the matter is far from satisfactory. Although by reason of its climatic conditions it will perhaps be difficult for any other country in the world, except South America, to compete with Java so far as cinchona production is concerned, we have no doubt that the Indian plantations could in time be enlarged sufficiently to make India entirely independent of foreign supplies of quinine. The Government of India is the only quinine-producing organization which can successfully break away from the bureau if it wants to do so.

380. The next question which remains is, what are the reasons for the great diversity between the amount of quinine necessary to cope with malaria and the amount which is actually consumed? There is obviously some powerful factor which is responsible, as otherwise the law of supply and demand would rapidly rectify the shortage. Besides, we have already seen that much more quinine is available than is actually consumed. The factor which militates against the more extended use of quinine is its high price. It is unnecessary to stress here that India is a very poor country and that her people with their low standard of living cannot afford to buy quinine for treatment at its present price.

381. The evil which results from a combination of high price and excess of demand over supply is that quinine in this country is one of the most frequently adulterated drugs. We were very greatly impressed by the large number of witnesses in the Punjab and other parts who came forward and denounced in no uncertain terms the quality of quinine sold in India. In the Legislative Assembly, Lieutenant-Colonel Gidney has so fully threshed out the subject that it is really not necessary to investigate it further. Quinine tablets, quinine solutions, quinine mixtures, quinine salts—all come in for a good deal of criticism. Some of the unscrupulous traders are undoubtedly making large profits by this criminal fraud on the public. Adulteration is rife; prescriptions containing quinine in solution, whether made in Government dispensaries or by private chemists and druggists, are said to be frequently dispensed with smaller doses than ordered. Tablets prepared by many firms contain much less quinine than they were stated to contain, and many have none whatever. That these accusations are not unfounded will be obvious by a reference to the appendix in which will be found a list of drugs which have been condemned. Samples of tablets were actually purchased and analysed by the Committee which, though marked quinine tablets, proved to contain no quinine at all. Theft by compounders, by dispensing smaller quantities than ordered and by appropriating the balance, is common and is actually within the experience of some of the members of the Committee. It is so easy to remove quantities of appreciable value for which a ready market is available. Major-General J. W. D. Megaw, I.M.S., collected a large number of quinine mixtures from dispensaries of various hospitals in Calcutta, the Punjab, and Madras and found that very few of them contained the requisite amount of quinine. After going into the matter deeply, we are of opinion that the state of affairs regarding the adulteration of quinine and its preparations is alarmingly serious. The introduction of a Pure Drugs Act may prevent the sale of adulterated quinine and its preparations to some extent, but it will not solve the whole problem. So great is the need for this drug, and so pressing the demand, that unless the price of quinine is reduced to bring it within the easy reach of the Indian masses the adulteration and

fraud will continue to go on in some form or other. The business is so lucrative that the unscrupulous dealers will take the risk and find some other means of defrauding the public.

382. The factors operating at present, which are responsible for the present price of quinine, have next to be examined.

383. The actual cost of production of quinine according to the figures supplied to us from the Quinologist Department, Bengal, during the last five years is given in the following table:—

	Cost of bark.	Cost of extraction.	Total cost.
	Rs.	Rs.	Rs.
1925-26	4·18	2·03	6·21
1926-27	3·84	1·59	5·43
1927-28	4 8	2·72	7·52
1928-29	4·6	2 72	7·32
1929-30	4·83	2·72	7·55

384. It will be perceived that the Government manufactures quinine at 7·55 rupees per pound at present. The selling price of quinine was fixed at Rs. 24 per pound in November 1924, and at Rs. 18 per pound in May 1926. Since then the price has remained stationary. It would appear that, even after leaving a fair margin of profit, quinine could be sold at about half the price which is being charged for it and this might bring it within the means of the masses to a considerable extent. It should not be forgotten, however, that the above rates are not worked out on commercial basis. All cinchona plantations represent a 'wasting asset' and replanting with or without a period of fallow is essential. Replanted areas rarely yield as much bark as the original plantations; frequently there is a complete failure. Other factors which have tended to increase the price of the bark during recent years are the rise in wages, and growing indirect charges on account of benefits to labour such as recognition of holidays, medical relief and allowances for the sick, maternity benefits, allowances for births and deaths, education, sanitation, water-supply, etc. When all these factors are taken into account and interest is charged on the capital utilized at the average borrowing rate of the Government, it can be imagined that the cost of production of the bark as well as the manufacturing cost will be considerably increased. When a plantation is not in bearing, the interest charge is added to the capital at compound interest. The cost price of quinine in Madras, where all these factors are taken into consideration, is not far from the rates fixed by the Kina Bureau at which it is being sold at present.

385. The Cinchona Department of Bengal may appear to be a paying concern from the report for 1929-30 which shows the valuation profit balance as Rs. 4,53,971-9-3; but this notion will soon be dispelled if all the factors described above are accorded due consideration.

386. From this it is obvious that the large volume of criticism levelled against the Government, by the witnesses who appeared before the Committee, for the maintenance of the price of quinine at a very high level in agreement with the Kina Bureau, is really unfounded and that the Government has excellent reasons to continue to adhere to the price fixed by the Bureau. The Committee, however, feels that interference is necessary to remedy the present state of affairs. Either the price must be reduced by mass production, or research work must be carried out to find out some means of presenting the people of India with quinine, or the total cinchona alkaloids, or the cinchona bark at a cost commensurate with the means at their disposal. The Committee is of opinion that, in the interest of public health and of supply of pure quinine to the people of India, steps should be taken to lower the prices of quinine as much as possible.

387. The only argument against lowering the price of quinine in India to below world-prices is that it may lead to export. This could be easily obviated by imposing a heavy export duty. If it is found impossible to lower the price of quinine, the only alternative is that suggested by Mr. C. C. Calder in the Annual Report of the Government Cinchona Plantation and Factory in Bengal for 1929–30, page 4: " We cannot get away from the fact that quinine is the rich man's remedy while malaria is the poor man's heritage; but let medicine once admit and practice the value of the other alkaloids and many Indian areas might then be turning out febrifuge at costs more suited to the poor. For, with a change of medical opinion and practice we could make use of kinds of cinchona that do not demand Java soil and climatic conditions for their best development." It is unfortunate for India that of all the alkaloids of cinchona bark the merits of quinine alone should have been recognized by the medical profession, with the result that a monopoly has been created for the plantations and factories of Java. A reference to the history of the treatment of malaria in a recently published work by Lieut.-Col. R. Knowles and Mr. Senior-White, shows that this routine use of quinine sulphate is more or less an accident and that " it is very far from certain that quinine is the best alkaloid of cinchona bark to use. Both quinidine and cinchonidine are more efficacious with regard to their anti-malarial power." The important investigation carried out by Dr. Fletcher in Kuala Lampur in the Malay States and the experience at the Calcutta School of Tropical Medicine show that alkaloids of cinchona bark other than quinine are quite effective in the treatment of malaria, if given in the usual doses in which quinine is given. The total alkaloids of the bark in the form of cinchona febrifuge have been used in the Carmichael Hospital for Tropical Diseases at the Outpatient Department of the school for many years with very satisfactory results.

388. It appears to us that the efficacy of the other alkaloids of quinine in the treatment of malaria has now been sufficiently

recognized by the medical profession and there is no reason why the policy advocated by Mr. Calder regarding cinchona plantation should not be adopted. Let quinine stand as the remedy for malaria for those who can afford to buy it, but let the total alkaloids of the bark, if not the bark itself, be made available to satisfy the requirements of the masses at a price which they can afford to pay.

389. Experience in India and specially in the Nilgiris has shown that *Cinchona ledgeriana*, from which most of the quinine supply of the world is obtained, is a relatively weak plant, short-lived, difficult to grow except under optimum conditions and apparently less vigorous as the quinine content of the bark increases. This tree yields quinine and very small quantities of the other cinchona alkaloids. On the other hand, *C. robusta* which is a more or less fixed hybrid between *C. succirubra* and *C. officinalis*, grows luxuriantly within a wider range of elevation and temperature, is decidedly less subject to diseases, and yields quinine and the other alkaloids in more or less equal proportions. Again, *C. succirubra*, the most easily grown tree of the lot, yields small quantities of quinine but a high percentage of cinchonidine and cinchonine and increases in size up to 40 years in South India. It is well known that the growing of cinchona in India by private agency has almost completely ceased due to the fact that *C. ledgeriana*, the bark of which alone found a profitable market, is difficult to grow, and little or no price is paid for those cinchona species yielding barks containing cinchonidine and cinchonine as the main alkaloids.

390. If a definite authoritative pronouncement were made by the medical authorities calling attention to the value of the other alkaloids of the bark, and the free use of cinchonine and cinchonidine is advocated, the problem of making India self-supporting in the matter of treatment of malaria would be made quite easy to solve in the course of a few years. If this is not done and the demand for quinine only is maintained, the Cinchona Department will never be able to produce sufficient quantities of this alkaloid to cope with the requirements of the country to efficiently deal with malaria and what is more important the price of quinine will never be reduced to bring it within the means of the masses.

391. Another advantage of this policy, if adopted, will be that the growing of cinchona by private agencies may be revived, and this may even lead to the extraction of the total alkaloids by private manufacturers. Mr. Calder in his memorandum says: "In my opinion the question of quinine extractions by private enterprise is one of minor importance. If it pays and local bark is available in quantity, such an industry as extraction of quinine from the bark can easily be left to look after itself. Apart from its associated technical and chemical problems, which Indian chemists should be quite capable of managing, there are not inherent difficulties in this side of the business." If that is the case

with quinine, the extraction of the total alkaloids from the bark should be a very much cheaper and easier proposition.

392. The Committee, therefore, desires to urge on the Government the necessity for examining the quinine policy in the light of the above remarks. The efficacy of the extended use of quinine in reducing the incidence of malaria and the mortality due to it has been demonstrated in Italy. As medical opinion is now becoming convinced that such alkaloids as cinchonine, cinchonidine and quinidine are just as effective in combating malaria as quinine, there is no reason why their use should not be extended.

393. The Committee considers (1) that the adulteration of quinine sold on the Indian market is widespread, (2) that the root cause of adulteration is the high price of quinine, and (3) that if the present policy of the Cinchona Department of growing only the species of cinchona which are most suitable for the production of quinine, in a limited area, is continued, it will be difficult to bring the price of the alkaloid down to the point of being commensurate with the means of the masses.

394. The Committee feels that the problem of adulteration of quinine will not be satisfactorily solved unless action is taken on the following lines:—

(1) The position with regard to the utility of the other alkaloids of cinchona bark, e.g., cinchonidine, cinchonine and quinidine, in the prophylaxis and treatment of malaria should be clearly defined. Most of the recent work shows that they are just as effective as quinine; but, if this is not considered convincing, special research on this question should be immediately taken in hand and definite ruling obtained;

(2) that, if this view proves correct, the Cinchona Department should cultivate the species of cinchona best suited to the Indian climate, on a sufficiently large scale to make India self-supporting with regard to these alkaloids and at prices commensurate with the economic condition of the masses; and

(3) that with a view to extend the cultivation of cinchona in India experiments be carried out in the growing of different varieties on a small scale in various areas, close connexion between the field and the laboratory being maintained.

SECTION VII

CHAPTER I

Finance

395. The proposals we have made in the preceding chapters for the control of drugs would involve additional expenditure. To mention some of the more important, the establishment of the Central and Provincial laboratories with adequate equipments and staff, the appointment of Inspectors, the exercise of control by frequent inspections, seizure of articles, buying of samples and their analysis and prosecutions for breaches of law, would undoubtedly increase the financial obligations of the State. The control suggested in relation to pharmacy and patent and proprietary medicines will also entail expenditure though of lesser magnitude. We regret that we have not had the time to obtain the requisite data to work out in detail the exact extent of the additional expenditure required for giving effect to our proposals.

396. We appreciate that finance is the crux of the problem in such cases. In the first place, we would point out that the objects in the present case are of such importance to the State that the expense cannot but be regarded as well worth incurring. The gain in the shape of improvement in the general health and welfare of the people, though not capable of assessment in terms of money, will be considerable. Secondly, we have already indicated certain additional sources of revenue. Our proposals involve the payment of fees for registration and licensing and for analysis and testing of samples. We have also suggested increase of import duty by 5 per cent generally on chemicals and drugs over the existing rates with the exception of crude drugs not available in India. As regards the latter, our recommendation is that the existing duty should be either totally abolished or appreciably reduced. We have also recommended increase by 20 per cent over the existing tariff on patent and proprietary medicines with undisclosed formulæ. In the absence of relevant statistics, which we have not been able to gather within the limited time at our disposal, we cannot estimate with any degree of accuracy the probable sum that may be raised annually by the imposition of increased duties. But, we have no doubt that it will be large and substantial. A study of the statistics set out in Table No. I referred to in Chapter III of Section I shows that the value of imports which would fall under the head of chemicals and drugs and patent and proprietary medicines would aggregate to a crore and odd every year. That India imported chemicals to the value of more than a crore of rupees was also the opinion of the Indian Industrial Commission so long ago as 1918. The increased percentage on

these now proposed will therefore amount to a few lakhs. It may, therefore, be reasonably assumed that the annual average under this head will be considerable. To this must be added the revenue yielded by the new duty on patent and proprietary medicines manufactured in India. There is no means of ascertaining this amount which in all probability will be a huge sum, having regard to the large number of such medicines one comes across in India. Nor can the loss of revenue resulting from the proposed abolition or reduction of duty on crude drugs not available in India be estimated; it is not clear how this will affect the position. We, however, feel that the net total increase will be fairly ample to meet the ends in view.

397. Lastly, we would recommend extensive Government grants and subsidies and contributions by district boards and municipalities and other local authorities who stand to gain by the assumption of control by the Government in respect of a subject which is essentially their concern. The proposals for such grants and contributions for supplementing the resources have the support of many witnesses. We would strongly urge that such help should not be stinted, even at the risk of effecting economies in other directions, in view of the supreme importance of the objects in view. In our search for ways and means, we have explored every possible avenue of taxation and cannot discover any other source than those already referred to.

Chapter II

Summary of Recommendations

398. The proposals which emerge from the conclusions arrived at in the preceding chapters may be briefly summarized under the following heads:—

(1) British Pharmacopœial drugs and well-known and approved medicines.

(2) Profession of pharmacy.

(3) Patent and Proprietary medicines.

(4) Medicines made from indigenous drugs.

(5) Development of the drug industry in India.

(6) Government Medical Stores Depot.

(7) Indian Pharmacopœia.

(8) Quinine policy.

Preliminary

399. There should be legislation to control drugs and pharmacy. The control in respect of drugs should be for those included in the British Pharmacopœia and other known and approved medicinal preparations, whether indigenous or not.

400. Legislation should be central with a view to secure effectiveness and uniformity in control throughout India.

401. Legislation should not be combined with that for foods as the control in respect of the latter should be Provincial, in view of the varying needs of the different provinces.

402. Legislation may consist of either a combined Drugs and Pharmacy Act, or a separate Drugs Act and a separate Pharmacy Act.

British Pharmacopœial drugs and Known and approved Medicines.

403. 'Adulteration' may be defined thus on the lines of section 3 (2) of the Calcutta Municipal Act, 1923:—

An article shall be deemed to be 'adulterated' in the case of drugs—

(i) if, when it is sold or exposed for sale under or by a name recognized in the British, German, American or any other Pharmacopœia which the Governor-General in Council, in consultation with the Advisory Board, may specify by notification in the *Gazette of India*, it differs from the standard of strength, quality or purity laid down in the said Pharmacopœia, unless the standard of strength, quality or purity of such drug be plainly stated on the bottle, box or other receptacle, or

(ii) if its strength, quality or purity falls below the professed standard under which it is sold or exposed for sale:

Provided that, when any drug is not sold or exposed for sale under or by a name recognized in any Pharmacopœia, and the standard of strength, quality or purity of such drug is not stated on the bottle, box or other receptacle, the drug shall be deemed to be sold or exposed for sale under or by a name in the British Pharmacopœia or other recognized standard.

'Misbranding' may be defined thus as in section 3 (42) of the said Act:—

All drugs, the package or label of which bears any statement, design or device regarding such drugs or the ingredients or substances contained therein as may be false or may mislead in any particular, shall be deemed to be 'misbranded'; and a drug shall also be deemed to be misbranded if it is offered for sale under the name of another drug.

'Prescription' in these proposals means prescription by rules made by the Governor-General in Council in consultation with the Advisory Board.

404. (*a*) A Central Laboratory should be established and maintained by the Governor-General in Council. It may be located either at Bombay or at Calcutta.

(*b*) The laboratory should be in charge of a Director with adequate staff and equipment.

(*c*) The laboratory should consist of two departments (1) Pharmacology and Bio-Chemistry and (2) Chemistry and Pharmacy. Each department should consist of one Deputy Director, one Assistant Director and two Senior Assistants. There should also be an adequate number of pharmacologists, bio-chemists, chemists and pharmacists with the necessary clerical and menial staff.

405. The functions of the Central Laboratory will be—

(i) to do research work on the pharmacological testing of drugs;

(ii) to train public analysts in the methods of chemical, biochemical and biological assay;

(iii) to undertake commercial testing of drugs for manufacturers and dealers on payment of the prescribed fees, particularly for those who are unable to set up their own laboratories for the testing of their products;

(iv) to prepare and maintain stable standards of strength, purity and quality for drugs;

(v) to standardize methods of analysis and tests with due regard to the climatic and other conditions prevailing in different parts of India;

(vi) to guide, co-ordinate and correlate the work of the Provincial Laboratories;

(vii) to act as expert referee in respect of disputed analyses of samples sent by Local Governments;

(viii) to periodically issue bulletins about its progress in various branches of its activities and supply information to manufacturers and Provincial Laboratories, as they may be in need of; and

(ix) to assay and test chemicals, drugs, biological products and organo-metallic compounds on request by any person including Local Governments, Provincial Laboratories or Inspectors.

406. Every Local Government should establish and maintain a testing laboratory in the Province in charge of a Public Analyst and a Deputy with adequate staff and equipment. The Local Government will appoint the Public Analyst and the staff, subject to prescribed rules, but the appointment of the Public Analyst will be subject to the approval of the Governor-General in Council.

407. The function of the said laboratory will be—

(*a*) to analyse and report on samples of drugs imported or made locally, other than biological and organo-metallic compounds, which are submitted to it for analysis in accordance with prescribed rules; and

(*b*) to undertake on payment of the prescribed fees, analysis of drugs at the request of manufacturers and others interested in obtaining its opinion.

408. For assisting the Governor-General in Council and advising him in making rules to carry out the objects of the Act, there should be an Advisory Board consisting of

(i) the Director-General of the Indian Medical Services (ex-officio) who will be the Chairman;

(ii) the Public Health Commissioner (ex-officio);

(iii) the Director and one other member of the staff of the Central Laboratory (ex-officio);

(iv) eleven members elected by the General Medical Council in India, the General Council of Pharmacy, the Medical Faculties of the Statutory Universities and the independent medical practitioners of India.

409. The elected members shall be honorary and shall hold office for a period of three years from the date of their election.

410. The sale, manufacture, or storage for sale of adulterated, misbranded or unwholesome drugs may be prohibited as in sections 406 and 412 of the Calcutta Municipal Act, 1923. The prohibition may also be extended to notified drugs or drugs bearing a similar name as in section 407 of that Act. Proof of purchase under a *bona fide* warranty and sale in the same condition as it was purchased may be recognized as a good defence [cf. section 136 (c) of the Rangoon Municipal Act, 1922]. Any breach of the proposed provisions or any Act in contravention thereof or of rules or of conditions imposed by licences should be made an offence.

411. Punishments for the offences by way of fine, imprisonment and confiscation should be adequate and deterrent, second and subsequent offences being treated with progressive severity.

412. Every manufacturer, importer and retail dealer of drugs and medicines should be required to take out an annual licence as prescribed.

413. Every place for the manufacture or retail sale of drugs and medicines should be registered as prescribed.

414. Such registration may be dispensed with in respect of the sale of—

(*a*) useful household remedies prescribed by the Governor-General in Council; and

(*b*) drugs and medicines in unbroken packages.

415. Inspectors should be appointed by the Local Government concerned subject to prescribed rules.

416. There should be provisions for inspection by Inspectors of places where drugs are kept or manufactured for sale, their seizure if suspected to be adulterated or misbranded and their destruction or disposal by magistrates; and for the procuring of samples, compulsorily or otherwise, and their analysis similar to the provisions contained in the Calcutta Municipal Act, 1923. In the case of biological and organo-metallic compounds, each lot of such products manufacured should be got analysed at the Central Laboratory before issue.

417. Purchasers, manufacturers and dealers also should be permitted to get samples analysed by Public Analysts.

418. In case the certificate of a Public Analyst is attacked by either party, the Court before which proceedings take place may, if it thinks fit, refer a sample to the Central Laboratory in the prescribed manner.

419. In relation to imported articles at the port of entry, such officer of Customs as may be generally or specially authorized thereto by the Commissioner of Customs and Excise will be the Inspector.

420. Any imported drug may, at the port of entry, be inspected and examined by the Inspector who may, after notice to the consignee, take samples thereof for analysis by the Public Analyst of the Province.

421. Pending analysis, the consignment may be detained or delivered to the consignee on such conditions as may be prescribed. Samples of imported biological and organo-metallic compounds should be sent to the Central Laboratory and there should be no delivery to the consignee until the inspection, etc., are complete.

422. If, on analysis, the article is found to be adulterated or misbranded, such article and others of the same kind included in the consignment may be deemed to have ' false trade description ' applied to them within the meaning of the Merchandise Marks Act and the Sea Customs Act and they may be confiscated or prohibited entry and disposed of in the prescribed manner.

423. If any drug is sold in a sealed original package which is adulterated or misbranded, the person who appears from the label thereof to have manufactured, imported or enclosed it in such package will ordinarily be held responsible and punished accordingly unless he shows that it was beyond his control and was due to deterioration or other change in the article since it left his possession.

424. As regards articles imported by land from a foreign territory or State in India within the meaning of the Land Customs Act, 1924, such officer as may be authorized by the Collector of Land Customs will be the Inspector.

425. The provisions as regards licence, inspection, sampling and analysis regarding imports by sea will apply *mutatis mutandis* to such goods also.

426. Adulterated or misbranded articles will be deemed to bear false trade description or misdescription within the meaning of the Merchandise Marks Act and of the Provincial Land Customs Acts as of Bombay, and will be dealt with accordingly.

427. The enforcement of the provisions of the Act in regard to Provinces should generally rest with the Local Governments concerned.

428. (i) The Governor-General in Council should have power, in consultation with the Advisory Board, to make rules for carrying out the purposes of the Act;

(ii) In particular and without prejudice to the generality of the above provision, the Governor-General in Council should be empowered to make rules in consultation with the Advisory Board.

(*a*) with reference to all matters required or allowed by the Act to be prescribed;

(*b*) prescribing the standards for the composition, strength, purity or quality of drugs or of any ingredient or component part thereof;

(*c*) prescribing units of standardization;

(*d*) prescribing the qualifications and duties of Public Analysts;

(*e*) regulating the method of election of Members to the Advisory Board by the General Medical Council and the Council of Pharmacy;

(*f*) prescribing methods of test and analysis of drugs;

(*g*) prescribing the procedure for the analysis of patent and proprietary medicines;

(*h*) prescribing a tariff of fees for registration and licensing;

(*i*) prescribing the forms and conditions of licences granted to the manufacturers, importers and retail dealers of drugs. Existing manufacturers will be allowed a period of five years within which they should satisfy the licensing authority that they are properly staffed and equipped for the purpose of manufacturing particular drugs and therapeutic substances;

(*j*) providing for the inspection of premises, equipment and technical qualifications of the staff of the manufacturers;

(*k*) prescribing the conditions for the registration of places for the manufacture or retail sale of drugs and medicines;

(*l*) prescribing the useful household remedies for the manufacture or sale of which no license or registration is required;

(*m*) requiring that manufacturers of specified drugs should submit test portions of each and every batch of such drugs to be tested in the Central Laboratory and requiring that only approved batches should be sold or offered for sale;

(*n*) for securing freedom from adulteration in the course of manufacture, preparation, storage, packing, carriage, delivery or exposure for sale of drugs and medicines;

(*o*) prescribing the qualification and duties of Inspectors;

(*p*) prescribing the procedure to get any article analysed by a Public Analyst or the Central Laboratory, the tariff of fees to be paid therefor and the form of certificate;

(*q*) prescribing the drugs of which the names and proportions should be conspicuously printed on the label or the wrapper of patent or proprietary medicines;

(*r*) prescribing the mode of labelling drugs sold in packages and the matter to be contained or not to be contained in such labels;

(*s*) prescribing the period from the date of manufacture, after the expiration of which biological and organo-metallic compounds may not be sold;

(*t*) prescribing the nature and limits of advertisements of drugs in general;

(*u*) prescribing the periodical testing of biological and organo-metallic compounds;

(*v*) for the control of advertisements relating to patent and proprietary medicines;

(*w*) regulating the disposal of the balance of funds (after meeting the expenses of drug control) in furtherance of drug industry; and

(*x*) to standardize weights and measures for the dispensing of medicines and for the sale of drugs.

The profession of Pharmacy

429. No person should be eligible for registration as a pharmacist unless he has—

(*a*) successfully undergone the undermentioned * course of training as laid down by the General Council of Pharmacy; or

(*b*) taken the degree of a Pharmaceutical Chemist of an Indian University.

430. Any person may be registered as a pharmacist without further training or qualifying examination who is—

(*a*) a duly qualified medical practitioner, registered or recognized, by the Provincial Council of Medical Registration or by the General Medical Council of the United Kingdom; or

(*b*) a holder of a British, American or foreign degree in pharmacy; or

(*c*) a holder of a diploma of the Pharmaceutical Society of Great Britain; or

(*d*) a holder of a degree in science of an Indian University with evidence of sufficient training in Pharmaceutical Chemistry.

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* The course of studies and the qualifying examination will be as follows:—

Two years' course leading to Pharmacist's Diploma (minimum basic qualification—Matriculation of any recognized University or any other equivalent examination).

Curriculum—First year—

(*a*) Botany as applied to pharmacy;
(*b*) Inorganic and organic chemistry;
(*c*) Physics;
(*d*) Theory and practice of pharmacy (preliminary);
(*e*) Pharmaceutical arithmetic (weights and measures, etc.).

First qualifying examination—

Second year.—After passing the examination at the end of the first year of study, the curriculum will include—

(*a*) Theory and practice of pharmacy (advanced),
(*b*) Pharmaceutical chemistry,
(*c*) Pharmacognosy,
(*d*) Elementary knowledge of action of drugs,
(*e*) Pharmacy law.

Final examination for pharmacist's diploma.—Theoretical, oral and practical.

Apprenticeship.—One year in an institution, hospital or dispensary (specified by the Provincial Pharmaceutical Council) to be undergone along with the second year's course.

431. Any person may be registered as a pharmacist until the expiration of a period of five years from the date of the passing of the Act—

(*a*) if he has successfully undergone the course of 'Chemist and Druggist' of the Madras Medical College, or

(*b*) if he has obtained a compounder's certificate from the State Medical Faculty, Bengal, after undergoing the revised course of training instituted in July, 1928; or

(*c*) if he is a qualified compounder and has been actively engaged in dispensing work for a period of not less than three years, or

(*d*) if he has been actively engaged in dispensing work without qualification for the preceding five years.

432. Provision should be made to institute a degree in Pharmaceutical Chemistry in the different Universities in India. Persons taking such degree will be eligible for registration as pharmacists.

433. The course for the degree in Pharmaceutical Chemistry should extend to two years after the Intermediate examination or four years after the Matriculation examination or its equivalent. In addition to a training in technical and practical Chemistry and Botany in the laboratory, the candidate should be required to undergo training in a manufacturing establishment in Manufacturing Pharmacy and in the methods of analysis and standardization of drugs.

434. No person should be allowed to use the name or title of a " Pharmaceutical Chemist " unless he has taken such degree.

435. No person should carry on compounding, mixing, preparing, dispensing, or selling any drug in any registered shop or place, unless he is registered as a pharmacist under the Act, but a firm or company or a person who is not properly qualified may keep an open shop for compounding, mixing, dispensing, etc., provided the management is undertaken by or under the supervision of a qualified registered pharmacist.

436. In the case of hospitals, dispensing, etc., must be undertaken under the supervision of a qualified pharmacist. The Provincial Council will have power to exempt from this requirement an institution where the employment of a qualified pharmacist is neither necessary nor practicable owing to the small amount of dispensing. In such an institution, dispensing must be undertaken by or under the supervision of a medical practitioner.

437. No person who is not a registered pharmacist should be allowed directly or indirectly

(*a*) to use the name or title of 'Registered Chemist,' 'Pharmaceutist,' 'Pharmacist,' 'Chemist and Druggist,' 'Dispensing Chemist,' 'Chemist,' or 'Druggist'; or

(*b*) to use or exhibit any name, title or sign holding out or implying that he is a registered pharmacist.

438. No registration is necessary in the case of—

(*a*) Persons selling drugs and chemicals in the ordinary course of wholesale dealing;

(*b*) persons selling drugs and chemicals in unbroken packages; and

(*c*) persons selling useful household remedies prescribed by the Governor-General in Council.

439. A Provincial Pharmaceutical Council should be formed in each Province including the Administered Areas and Commissionerships, consisting of eleven members, of whom seven will be elected from among themselves by registered pharmacists and four (who need not necessarily be registered pharmacists) will be nominated by the Local Government. But the first Council will consist entirely of persons nominated by the Local Government from among those who will be eligible for registration as Pharmacists.

440. The period of office of each member will be three years from the date of election or nomination as the case may be.

441. Each Provincial Pharmaceutical Council should hold at least one meeting during a period of three months.

442. The Provincial Pharmaceutical Council will have power—

(*a*) to maintain a register of all registered pharmacists of the Province and to register the names of Pharmacists on payment of such fees as may be determined by the General Council of Pharmacy;

(*b*) to prescribe the educational institutions in which candidates for qualification and registration as pharmacists should undergo training and the places in which and the conditions under which apprenticeship should be served;

(*c*) to conduct an examination for Pharmacists under the guidance of the General Council of Pharmacy and to grant certificates;

(*d*) to investigate all complaints regarding registered Pharmacists of the Province and to remove the name of any person convicted of specified offences from the register of Pharmacists, subject to an appeal to the General Council of Pharmacy;

(*e*) to restore for good and sufficient reasons the names of Pharmacists removed from the register under the preceding clause;

(*f*) to send to the General Council of Pharmacy an annual report of its proceedings during the last preceding year; and

(*g*) generally to act under the control and direction of the General Council of Pharmacy.

443. A Central Council known as "The General Council of Pharmacy" consisting of 15 members of whom 12 members will be representatives from the Provincial Pharmaceutical Councils and three nominated, should be formed.

Each of the Provincial Pharmaceutical Councils of Bengal, Bombay and Madras will elect two members from among themselves and each of the Provincial Pharmaceutical Councils of the Punjab, the United Provinces, the Central Provinces and Bihar and Orissa, Assam and Burma will elect one member from among themselves to the General Council of Pharmacy. In case of appeals from the Administered Areas and Commissionerships, the General Council will have power to co-opt for purposes of hearing the appeal, any member from the Pharmaceutical Councils existing in those places.

The Governor-General in Council will nominate three members to the General Council of Pharmacy who need not necessarily be pharmacists.

444. The period of office of each member of the General Council of Pharmacy will be three years.

445. The General Council of Pharmacy should hold at least one meeting during every period of six months.

446. The General Council of Pharmacy will have power—

(*a*) to correlate and co-ordinate the activities of the different Provincial Pharmaceutical Councils;

(*b*) to organize the practice of pharmacy by setting up a uniform system of training and education all over India;

(*c*) to exercise general disciplinary control over all the registered Pharmacists in India and, in cases where such powers are expressly given to the Provincial Pharmaceutical Councils, to exercise such power only by way of revision or appeal;

(*d*) to specify the fees and conditions for registration in respect of Pharmacists;

(*e*) to prescribe the form and contents of the registers to be maintained by the Provincial Pharmaceutical Councils; and

(*f*) to make such by-laws and regulations as may be necessary for the better control of the profession of pharmacy from time to time.

Patent and Proprietary medicines

447. Every patent and proprietary medicine with a 'secret formula' manufactured in India or imported into India should be required to be registered on payment of a prescribed fee and a certificate of registration obtained for it, on the lines of the Patent and Proprietary Medicine Act of Canada.

448. The certificate will be issued only on the disclosure of each medicinal ingredient to the department concerned.

449. If alcohol in excess of 5 per cent is present, the name and proportion of each ingredient which medicates the preparation so as to unfit it for use as an alcoholic beverage should be given to the department.

450. If the medicine contains any of the specified (namely, those mentioned in the schedule to the Patent and Proprietary Medicine Act of Canada) drugs, the proportions of the ingredients should be given to the department and also mentioned on the label.

451. If the medicines are found to be harmful or of a bogus nature, the Governor-General in Council in consultation with the Advisory Board should be empowered to prohibit their use. The manufacturer or importer should also be punished and the stocks forfeited.

452. The use of opium and its derivatives in medicines for internal use and cocaine and its salts in any medicine, whether for internal or external use, should be prohibited.

453. Drugs must be designated by their commonly used names.

454. The provisions for inspection, seizure, etc., of other drugs and chemicals should be made applicable to all patent and proprietary medicines.

455. The author or the person responsible for the publication of fraudulent advertisements regarding patent and proprietary medicines and the printer and the publisher should be punished.

456. Advertisements relating to aphrodisiacs, veneral diseases, remedies for maladies of women, cures for cancer, leprosy and tuberculosis should be prohibited.

457. No false, misleading or exaggerated claims should be permitted to be made on labels, wrappers or advertisements.

458. The general control of advertisements in other respects should be left to be prescribed by rules made by the Governor-General in Council.

459. Imported patent and proprietary medicines with secret formulæ should, in addition to existing customs duties, bear a special duty of 20 per cent *ad valorem*.

460. Medicines with secret formulæ manufactured in India should bear a revenue stamp of four annas on each rupee of its market value.

461. Proprietary remedies with disclosed formulæ should be subject to the following restrictions:—

(*a*) the name should reflect the composition of the product and not its clinical use;

(*b*) the provisions as to advertisements and the other provisions of a general nature relating to patent medicines with secret formulæ should apply to these also;

(*c*) the formula should be exhibited on the label of the actual container—if a simple chemical substance, the scientific name and chemical formula; if a mixture, details of composition.

Medicines made from indigenous drugs

462. The crude single drugs as well as the compounded medicines used in the indigenous systems of treatment, should be brought under control.

463. The control of such drugs and preparations should for the present be kept entirely separate from that of Western drugs and preparations.

464. The introduction of a uniform curriculum for the instruction and training of indigenous practitioners should precede the exercise of any system of control.

465. The practice of Indian medicine should be restricted to properly trained, qualified and registered practitioners.

Development of the drug industry in India

466. The Universities in India should be required to give training in advanced Pharmaceutical Chemistry and institute a degree on the subject.

467. The quality of crude drugs, both imported and grown in the country, should be strictly controlled.

468. The import duty on manufactured drugs should be increased by five per cent.

469. The import duty on crude drugs not available in India should be abolished or appreciably reduced.

470. The imposition of export duty on raw materials obtainable only in India should be considered.

471. The question of supplying solvents at reduced prices should be seriously examined and duties on such solvents used, at any rate, for *bona fide* chemical purposes should be abolished or reduced.

472. The restrictions upon the free transit of spirituous preparations between the different provinces in India should be removed.

473. The Excise regulations should be modified so as to remove the hardships referred to in Chapter I of Section IV and they should generally be worked in a sympathetic spirit.

474. The question of reduction of railway freights on raw materials and indigenous drugs manufactured in India should be considered.

475. The drug industry in India should be encouraged by the Government by the purchase of the required supplies of medicinal preparations, surgical dressings, chemicals, etc., from Indian manufacturers as far as possible.

476. The Central Laboratory should be staffed by experts who are capable of giving sound advice to all interested persons on manufacturing processes, the requirements as to machinery and general plant that may be necessary for carrying on the industry and the technical difficulties which may arise in relation to it.

477. Every encouragement should be given to promote the cultivation of medicinal plants and herbs.

Government Medical Stores Depots

478. As local manufacturing progresses and good quality drugs are obtainable on the Indian market at a cheaper rate the manufacturing should be gradually reduced till it is stopped.

479. The Committee is of opinion that as the drug industry grows the Medical Stores Depots should gradually remove such medical institutions as are not definitely entitled to obtain supplies from the Depots, viz., District Board and Municipal hospitals, Railway institutions, Indian States, etc., from their list.

480. Supplies for the Stores Depots should be obtained so far as possible from local manufacturers.

Indian Pharmacopœia

481. Steps should be taken to compile an Indian Pharmacopœia without delay.

482. This work should be on the lines of the British and United States Pharmacopœias including only drugs of known composition, of definite pharmacological action, of well-established therapeutic properties, with the toxicity fully worked out and the necessary standards of chemical and biological assay for determining the safe maximum doses.

483. The draft should be compiled on the model of existing pharmacopœias, and should contain (1) such of the therapeutically active substances and pharmaceutical necessities as are found suitable for India, and (2) substitutes, and additions from the indigenous *materia medica*.

484. The desirability of entrusting the work of compiling the Indian Pharmacopœia to the officers of the Pharmacological Laboratory, Parel, Bombay, may be considered.

Quinine policy

485. The position with regard to the utility of the alkaloids of cinchona bark other than quinine in the prophylaxis and treatment of malaria should be clearly defined.

486. The Cinchona Department should cultivate the species of cinchona best suited to the Indian climate, on a sufficiently large scale, to make India self-supporting with regard to the alkaloids and at prices commensurate with the economic condition of the Indian people.

487. With a view to extend the cultivation of cinchona in India, experiments should be carried out in the growing of different varieties on a small scale in various areas, close connexion between the field and the laboratory being maintained.

CHAPTER III

Conclusion

488. Our task is completed. The synopsis of our proposals set out in the previous chapter briefly sums up our recommendations in respect of the terms of reference embodied in Resolution No. 1637, dated the 11th August 1930, of the Government of India. Our view that foods and drugs should be kept distinct and that legislation in respect of the latter should be Central disposes of the request of the Government of Bombay for amendment of the Bombay Prevention of Adulteration Act, 1925, so as to make it applicable to drugs also, conveyed in their letter No. 7964-D, dated the 2nd August 1930, to the Government of India, which was communicated to us for consideration. It follows that it is not expedient to amend the Bombay Adulteration Act dealing with foods so as to include drugs in view of our proposals for legislation of a comprehensive character in respect of drugs by the Indian legislature.

489. Some of our proposals require legislation to give effect to them, while others may be enforced by administrative action on the part of the Government. Almost all the proposals regulating the control of drugs such as those providing for definitions of 'adulteration' and 'misbranding,' the institution of central and provincial laboratories, inspection, seizure, compulsory purchase of samples, analysis, registration, licensing, creation of offences for breach of law and rules, punishment of offenders, etc., require legislation for their enforcement. So also those relating to the regulation of patent and proprietary medicines and the profession of pharmacy. Proposals regarding the fostering of drug industry, the quinine policy of the Government, the preparation of the Indian Pharmacopœia, etc., may, however, be given effect to by departmental action.

490. As regards those proposals which are dependent on legislation for their operation, the question arises whether legislation should be Central or Provincial. The Devolution Rules framed under section 45-A of the Government of India Act classify the subjects into 'Central' and 'Provincial' for distinguishing the functions of the Indian legislature and of the Local Legislatures of the Governor's Provinces. Medical administration, including provision for medical education, public health, excise, administration of justice (subject to legislation by the

Indian legislature as regards High Courts, Chief Courts and Courts of Judicial Commissioners and any courts of criminal jurisdiction), non-judicial stamps (subject to legislation by the Indian legislature), development of industries, stores, adulteration of articles, control of poisons (subject to legislation by the Indian legislature), control of newspapers, regulation of medical and other professional qualifications and standards (subject to legislation by the Indian legislature) and sources of Provincial Revenue, are Provincial subjects. Posts, customs, excise duties, civil law including laws regarding property, civil rights and liabilities and civil procedure, control of production, supply and distribution of any articles in respect of which control by a central authority is declared by rule made by the Governor-General in Council to be essential in public interest (e.g., quinine and cinchona), inventions and designs, criminal law including criminal procedure and legislation in regard to any Provincial subject in so far as such subject is stated to be subject to legislation by the Indian legislature are Central subjects. It will be perceived that some of our proposals fall under the class of Provincial subjects. But, a few of those are subject to legislation by the Indian legislature and a good many are Central subjects. In the case of legislation relating to the latter class of subjects, the local legislatures require the previous sanction of the Governor-General under section 80-A before taking them into consideration. Such sanction is also required for passing any law (*a*) imposing any new tax not included in the Scheduled Taxes Rules or (*b*) affecting customs duties or any other tax or duty in force and imposed by the Governor-General in Council for the general purposes of the Government of India or (*c*) altering certain laws, such as the Indian Penal Code and the Indian Evidence Act.

491. There is also a large volume of opinion that it is desirable to have uniformity in laws relating to drugs and the profession of pharmacy in force throughout the entire extent of India. In view of these considerations, we strongly recommend that legislation to give effect to our proposals may be introduced into the Indian legislature. Under clause (2) of section 67 of the Government of India Act, it is lawful to introduce at any meeting of either chamber of the Indian legislature any measure regulating any Provincial subject with the previous sanction of the Governor-General. It is, therefore, competent for either chamber of the Indian legislature to deal with a measure giving effect to our proposals, including even those relating to Provincial subjects, with the requisite preliminary sanction of the Governor-General. In these circumstances, we would recommend that necessary action may be taken in either chamber of the Indian legislature to give effect to our proposals which require legislation for their enforcement. We should have very much liked to

have attached a draft Bill to our report containing provisions giving effect to our proposals and showing to what extent the existing laws require amendment. But, here again, the limitations of time, which have rendered it absolutely impossible to make any attempt towards this end, is our only excuse.

492. In this connexion, we are conscious that the Indian Industrial Commission reported in 1918 that "the adulteration of drugs is difficult to deal with and it is doubtful if legislation is likely to be very effective in this direction." We entirely concur with the view that the problem is beset with extraordinary difficulties. We also appreciate that legislative aid should not be invoked unless it is inevitable and will prove beneficial. Without minimizing the difficulties to any extent, we venture to think that the scheme envisaged by us is such as is calculated to achieve a fair measure of success in the realization of the end in view. The main proposals of our scheme—the centralization of control by vesting it with the Governor-General in Council without detracting from Provincial responsibility in respect of details purely local in character, the maintenance of uniformity in essentials by the institution of a strong Advisory Board and a well-equipped Central Laboratory and the creation of efficient branch laboratories working under their direction and control to serve Provincial needs—will, we feel, go a long way towards effecting a successful solution of the problem. We are confident that our scheme for the improvement of the profession of pharmacy, for which we do not claim much originality, will be equally efficacious in introducing the much-needed reforms to organize the profession and put it on a proper basis. Our suggestions for the control of the trade in patent and proprietary medicines the formulæ of which are not disclosed and the obnoxious advertisements in relation thereto represent the barest minimum. We know that some of our proposals will strike at vested interests and are sure to arouse vigorous opposition. But, so far as we have been able to gauge public opinion, we are impressed with the sincerity, force and earnestness of the general demand for reform on the lines indicated by us. We would stress the need for energetic action on the part of the Government. We would commend to the sympathetic consideration of the Government the recommendations designed for the control of the drugs in use in the indigenous systems of medicine, and for modification of the quinine policy. We also hope that the proposals made for fostering the drug industry in India and for the preparation of an Indian Pharmacopœia will receive the careful attention which we think they merit.

493. We do not pretend to have found a *panacea* for all the ills to which the traffic in drugs and the profession of pharmacy

are subject. Nor do we claim to have discovered a permanent solution of the problem. We have done our best to find remedies, inadequate or incomplete though they be, to cure some of the crying evils without violent disturbance of the existing state of affairs. Our scheme is the best that we can offer under the peculiar conditions of the country and we have only to add that it may be given a fair trial—taken and worked as a whole.

R. N. CHOPRA, *Chairman.*
J. F. CAIUS.
H. COOPER.
ABDUL MATIN CHAUDHURY.

C. GOVINDAN NAIR, *Secretary.*
B. MUKERJEE, *Assistant Secretary.*

29th March 1931.

PART II.—APPENDICES.

PART II—APPENDICES

APPENDIX A

General

(1)

Copy of letter No. 483-H., dated the 8th March 1929, from the Secretary to the Government of India, Department of Education, Health and Lands, to all Local Governments.

[Measures to control the preparation and sale of medicinal drugs.]

I am directed to refer to the correspondence ending with your letter No.

Madras, dated 16th June 1927.
Bengal, 430-T.A.I., dated 12th September 1927.
United Provinces, 6932-C., dated 22nd October 1927.
Punjab, 28975-H.Mehd., dated 12th November 1927.
Bihar and Orissa, 1392-L.S.G.R., dated 24th June 1927.
Burma, S. 27, dated 20th July 1927.
Central Provinces, 4111/510-IX., dated 19th August 1927.
Assam, 134-L.S.G., dated 18th August 1927.

(this department letter No. 1908-H., dated the 7th November 1928.)

The question of the control of the preparation and sale of medicinal drugs has been examined further in the light of the replies from Local Governments to this department letter No. 624-Health, dated the 19th April 1927. The replies show that, generally speaking, no effective measures are at present in force in India to give the customer protection against fraud and risk to health, or even to life, resulting from the use of inferior and injurious drugs. The question, therefore, arises whether any protective measures can be introduced.

2. The problem is full of complexities. In India, besides the western system of medicine, there are two other systems which are widely practised, viz., Ayurvedic and Unani. Each system has its own pharmacopœia, which is practically a sealed book so far to modern science. The Government of India have carefully considered whether these drugs could be included in the scope of any measure of control which it may be decided ultimately to adopt. They have come to the conclusion that this would be impossible, since control pre-supposes a knowledge of the ingredients and composition of the articles which it is proposed to control, and such knowledge in respect of Ayurvedic and Unani medicines is far from complete. Control also pre-supposes the feasibility of applying analytical tests to determine whether a particular sample comes up to, or falls short of, the prescribed standard. This again is not possible in respect of Ayurvedic and Unani medicines. The problem is thus limited to a consideration of the measures to be adopted for controlling the sale and manufacture of allopathic drugs.

3. Even this limited problem bristles with difficulties. Our knowledge of the drugs which are sold to the public in an adulterated form and of the extent of such adulteration is far from complete. Information on these points has, therefore, to be collected to provide the data for considering (i) what form control should take, and (ii) how control should be exercised. As regards (i) the provisions of the existing laws, e.g., Provincial Food and Drugs Acts must be scrutinized in order to determine what powers for controlling the evil already exist and what further powers, if any, are needed. Under (ii) will fall the question of the machinery for exercising such control, viz., (*a*) an agency for analysing and testing the composition of drugs, and (*b*) the detective and preventive agency required for enforcing the law against adulteration and fraud.

4. The Government of India are of opinion that the most practical and satisfactory method of ascertaining how the problem should be dealt with would be to appoint a small *ad hoc* committee which would explore and define the scope of the problem with reference to actualities, and make recommendations as to what steps, if any, are necessary to arrive at a satisfactory solution. The terms of reference of the Committee might be as follows:—

"To enquire into the extent to which drugs recognized by the British Pharmacopœia but of impure quality or defective strength are imported manufactured and sold in British India, and the necessity, in the public interest, of controlling such importation, manufacture and sale; and to make recommendations." As regards the personnel of the Committee, it has been suggested that two medical experts (of whom one should be the chairman), one representative of the drug trade, and one lay man to represent the consumer should be adequate. An officer with legal experience might be appointed Secretary to the Committee so as to provide the necessary legal assistance in suggesting draft of legislation, should the Committee decide to recommend legislation as part of the plan for dealing with the problem. The Government of India will be glad to be favoured with the views of the (Local) Government on the proposal to appoint a Committee and on its proposed terms of reference and personnel.

5. An estimate of the cost of the proposed Committee will be worked out when the replies of all local Governments to this letter have been received, and if the idea of appointing a Committee meets with general acceptance, the Government of India's provisional view is that one half of the cost should be met from central revenues, and the other half should be shared among the Provincial Governments in equal parts. They will be glad to have the views of the Local Government on this point as well.

Copy of telegram No. 2468-*H., dated the* 16*th December* 1929, *from the Secretary to the Government of India, Department of Education, Health and Lands, to all Local Governments.*

Majority of local Governments have agreed to the appointment of Committee referred to in this Department's letter No. 483-Health, 8th March and to the apportionment of expenditure as suggested in paragraph 5 thereof. Government of India have accepted the suggestion that the Committee should also report whether their recommendations can be extended to medicines made from indigenous drugs and should enquire into necessity of legislation to restrict exercise of profession of chemists to duly qualified persons.

2. Committee is expected to take not more than six months to submit its report.

Letter No. 171-*L.S.G., dated the* 17*th October* 1930, *from the Deputy Secretary to the Government of India, Department of Education, Health and Lands, to the Chairman, Drugs Enquiry Committee.*

[Amendment of the Bombay Prevention of Adulteration Act, 1925, so as to make it applicable to drugs as well as food.]

I am directed to forward a copy of a letter from the Government of Bombay No. 7964-D., dated the 2nd August 1930, with enclosures, on the subject noted above, in which that Government request that the question of amending the Bombay Prevention of Adulteration Act, 1925, so as to make it applicable to drugs as well as food, may be examined by the Drugs Enquiry Committee.

2. The Government of India are of opinion that this request should be complied with, if you have no objection and if the Committee has time to consider the matter. In paragraph 3 of this Department Circular letter No. 483-H., dated the 8th March 1929, which was addressed to all local Governments before the Committee was appointed, it was suggested that one of the tasks which the Committee would have to undertake was the examination of provincial Food and Drugs Acts to see what powers they contain for controlling the sale of adulterated drugs. Having regard to the

statement so made and also to the fact that the Bombay Government are contributing towards the cost of the Committee, the Government of India think it desirable that your Committee should examine and report on the question which the Bombay Government have raised. Your report on the subject may, however, if you consider it appropriate, be made independently of the general report which the Committee will make as the result of its enquiries . . .

Copy of letter No. 689, *dated 4th December* 1930, *from the Secretary, Drugs Enquiry Committee, to the Deputy Secretary to the Government of India, Department of Education, Health and Lands.*

With reference to your letter No. 171-L.S.G., dated the 17th October 1930, I have the honour to say that the Committee has been considering the question of a combined Food and Drugs Act for India and that the question of amending the Bombay Prevention of Adulteration Act, 1925, so as to make it applicable to drugs as well as food, will be examined and reported upon as desired by the Government of India although the Committee feels that the time fixed for the submission of the main report is itself utterly inadequate.

(2)

Circular letter, dated the 2nd September 1930, *from the Secretary, Drugs Enquiry Committee, forwarding the Questionnaire.*

In pursuance of a resolution which was adopted by the Council of State urging the Government to take such steps as may be possible to control the indiscriminate use of medicinal drugs and to legislate for the standardization of the preparation and for the sale of such drugs, the Government of India, after consulting and with the approval of the local Governments, have appointed a Committee to explore and define the scope of the problem and to make recommendations as to the measures which should be taken.

2. The terms of reference to the Committee (vide Gazette of India Notification No. 1637, dated the 11th August 1930) are as follows:—

"(i) To enquire into the extent to which drugs and chemicals of impure quality or defective strength, particularly those recognized by the British Pharmacopœia, are imported, manufactured or sold in British India, and the necessity, in the public interest, of controlling such importation, manufacture and sale, and to make recommendations;

(ii) to report how far the recommendations made in (i) may be extended to known and approved medicinal preparations other than those referred to above, and to medicines made from indigenous drugs and chemicals; and

(iii) to enquire into the necessity of legislation to restrict the profession of pharmacy to duly qualified persons, and to make recommendations."

3. The necessity of some measures of this description is obvious equally from the point of view of the manufacturer and dealer who wishes to carry on his business honestly, the medical man who expects results from the medicine he prescribes, and the consumer who is dependent upon both. It is well known that many unscrupulous people, realizing that to analyse and standardize medicinal preparations requires experienced men and expensive and elaborate laboratory equipment, take advantage of this knowledge to carry out extensive adulteration, use inferior drugs, and, in the case where raw material is expensive, purposely reduce the quantity that should be used in order to sell it at a low price. This is not only carried out in India but some European firms export medicines specially manufactured for the eastern bazaars.

4. The Committee desire to have the views of all persons, associations or bodies interested in this question with respect to the points mentioned in the terms of reference. With a view to elucidate the different aspects of this problem they have drawn up a questionnaire, a copy of which is attached herewith. These questions have been drawn up with the sole object of eliciting information and it is hoped that detailed reply will be sent to these supported by arguments and statistics wherever possible. It is earnestly requested that the replies to the questionnaire may kindly be sent so as to reach the Secretary before the 1st October 1930.

5. The Committee will also visit important centres in different provinces and will take evidence on the questions stated in the terms of reference and on the questionnaire which is being issued. I therefore wish to enquire if you are willing to appear before the Committee to give further information regarding your answers in case the Committee consider it necessary.

6. Replies to the questionnaire and all other communications may please be addressed to the Secretary, Drugs Enquiry Committee, School of Tropical Medicine, Calcutta.

(3)

Copy of the Questionnaire

For the Medical Profession.

(Kindly return duly answered and signed.)

Questions.	Answers.
1. Have you any occasion to think that your patients are getting drugs and chemicals of defective strength and impure quality?	
2. What personal experience have you of adulteration or inferior quality in medicinal preparations? Please give details:	
(*a*) Pharmacopœial preparations.	
(*b*) Proprietary preparations.	
Indian manufacture. Inferior quality. Adulterated.	Imported. Inferior quality. Adulterated.
3. What is your opinion regarding the biological products offered for sale in India? Have you ever had any reason to believe that they are not of the proper strength?	
4. Do you feel that there ought to be some legislation to control the potency and purity of drugs and chemicals manufactured locally and imported from abroad?	
5. Do you consider that control of therapeutic agents on the lines enacted in such countries as Great Britain, United States of America, etc., is desirable in this country?	
6. If not, what suggestions have you to put forward regarding such control?	
7. What is your opinion regarding standardization of various preparations made from drugs used in the indigenous medicines on the Indian market? Do you use them much?	
8. Are you aware of any cases where such preparations were proved to be inactive or harmful? Do you think it is possible to control them in the same way as the pharmacopœial preparations?	

Questions.	Answers.
9. What is your opinion regarding the increasing sale of proprietary remedies, particularly those with secret formulæ, on the Indian market? What control in your opinion should be exercised over them?	
10. Have you had any experience of inaccurate dispensing?	
11. Have you any other remarks to make with regard to the purity of drugs in general or any other matters in this connexion?	

I. To be answered by manufacturers of drugs and chemicals.

Questions.	Answers.
1. State as nearly as possible your annual output of the following:—	
(*a*) Tinctures and other spirituous preparations.	
(*b*) Liquid Extracts.	
(*c*) Solid Extracts.	
(*d*) Mineral Acids.	
(*e*) Inorganic Chemicals.	
(*f*) Organic Chemicals.	
(*g*) Alkaloids.	
(*h*) Organic antimony and arsenic compounds.	
(*i*) Organo-therapeutic products.	
(*j*) Vaccines and sera.	
(*k*) Proprietary liquid preparations.	
(*l*) Proprietary solid preparations.	
(*m*) Any other liquid preparations.	
(*n*) Any other solid preparations.	
2. What difficulties do you experience from the following causes:—	
(*a*) In obtaining indigenous raw materials of standard quality?	
(*b*) Due to Customs and Excise regulations.	
(*c*) In connexion with any other factors in the drug manufacturing trade.	
3. What arrangements have you for the biological control of preparations which cannot be standardized chemically?	
2 How many qualified compounders materials? What arrangements have you for the analytical control of such material and the finished products you manufacture?	

Questions.	Answers.
5. State the names and qualifications of all chemists you employ?	
6. How many employees have you in the factory and laboratories?	
7. Do you think samples of raw materials and finished products should be examined at a Central Laboratory?	

II. To be answered by Importers and Dealers.

1. State as nearly as possible the quantity imported per annum, approximate value and country of origin of the following:—

	Quantity imported per annum.	Value	Country of origin.
(*a*) Tinctures and Spirits.			
(*b*) Liquid Extracts.			
(*c*) Solid Extracts.			
(*d*) Mineral Acids.			
(*e*) Inorganic Chemicals.			
(*f*) Organic Chemicals.			
(*g*) Alkaloids.			
(*h*) Organic antimony and arsenic compounds.			
(*i*) Organo-therapeutic products.			
(j) Vaccines and sera.			
(*k*) British Proprietaries.			
(*l*) French Proprietaries.			
(*m*) German Proprietaries.			
(*n*) American Proprietaries.			

2. Give names and addresses of firms for whom you are a special agent.	
3. Do you always supply in original containers as received?	
4. Do you buy in bulk and pack under your own name?	
5. What guarantee do you receive of the standard of purity of all imported medicines?	
6. What precautions do you take on receipt, that the goods are up to standard?	

III. To be answered by Dispensing Chemists.

1. What precautions do you take to ensure that all drugs and chemicals used are of standard strength and purity?	
2. How many qualified compounders do you employ?	

Questions.	Answers.
3. What is the average number of prescriptions you dispense a day?	
4. What system of check do you employ in dispensing?	
5. What difficulties do you experience from the Poisons Regulations?	

IV. General — To be answered by all.

1. Do you consider that control of therapeutic agents on the lines enacted in such countries as Great Britain, United States of America, etc., desirable in this country?	
2. If not, what other suggestions have you to put forward to ensure the purity and activity of all medicinal substances manufactured or imported?	
3. What is your opinion regarding standardization of various preparations made from drugs used in the indigenous medicines, on the Indian market?	
4. Are you aware of any cases where such preparations were proved to be inactive or harmful? Do you think it is possible to control them in the same way as the pharmacopœial preparations?	
5. What is your opinion regarding the increasing sale of proprietary remedies, particularly those with secret formulæ, on the Indian market? What control in your opinion should be exercised over them?	
6. What personal experience have you of adulteration or inferior quality in medicinal preparations? Please give details: (*a*) Pharmacopœial preparations. (*b*) Proprietary preparations.	
7. Have you any other remarks to make with regard to the purity of drugs in general or any other matter in this connexion?	

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Indian manufacture.		Imported.	
Inferior quality.	Adulterated.	Inferior quality.	Adulterated.

Signature.

N.B.—If the space allotted for replies is insufficient, kindly write on separate sheet and attach.

(4)

List of those who sent replies to the Questionnaire

MADRAS PRESIDENCY, INCLUDING BANGALORE AND MYSORE

Khan Bahadur Muhammad Azizullah Sahib Bahadur, B.A., M.B.C.M., Acting Professor of Chemistry, Medical College, Madras.

Dr. Henry S. Hensman, M.R.C.S., L.R.C.P., M.P.C., Superintendent, Government Mental Hospital and Lecturer in Mental diseases, Medical College, Madras.

The District Medical Officer, Cuddapah.

Dr. P. R. Venkatarama Ayyar, M.B. & C.M., District Medical Officer, Kistna.

Major N. M. Mehta, I.M.S., District Medical Officer, Trichinopoly.

Dr. B. T. Krishnan, B.A., M.B., B.S., Acting Professor of Physiology, Madras Medical College, Madras.

Dr. K. Koman Nayar, L.R.C.P., & S., D.O.M.S., Acting Professor of Ophthalmology, Medical College and Acting Superintendent, Government Ophthalmic Hospital, Madras.

Dr. P. A. Mathew, B.A., M.B., B.S., Acting Professor of Bio-Chemistry, Medical College, Madras.

Diwan Bahadur Dr. G. V. James, M.B., C.M., Third Surgeon and Lecturer in Principles of Surgery, Medical College, Madras.

Dr. K. Venkatachalam Pillai, L.M. & S., Acting Professor of Pharmacology, Medical College, Madras.

Dr. V. P. Kamath, L.M. & S., District Medical Officer, South Arcot.

Dr. K. Narayanaswami Ayyar, L.M. & S., District Medical Officer, Tinnevelly.

Dr. Miss G. Stapleton, M.D., B.S., Superintendent, Lady Willingdon Medical School for Women, Madras.

Lieut.-Col. G. G. Hirst, I.M.S., Government Medical Stores Depot, Madras.

Dr. M. R. Guruswami Mudaliar, B.A., M.D., Professor of Therapeutics, Medical College, Madras.

Lieut.-Col. C. A. F. Hingston, C.I.E., O.B.E., M.R.C.S., I.M.S., Principal and Professor of Midwifery, Medical College, Madras.

Dr. T. Krishna Menon, M.B., C.M., M.R.C.S., Honorary Physician, General Hospital, Madras.

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Dr. K. N. Pradhan, Amrit Pharmacy, Sitabaldi, Nagpur.

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Dr. K. S. Sethna, Medical Officer of Health, Municipal Committee, Delhi.
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Dr. Salim-uz-zaman Siddiqui, B.A., D.PHIL. NAT. (Fft./M), Director, Research Institute, A & U., Tibbi College, Delhi.
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Rash Behary Sen, Esq., c/o H. C. Sen & Co., Chemists, Delhi.
Dr. A. Roy Choudhury, Lady Hardinge Road, New Delhi.

(6)

Rules relating to the appointment and functions of co-opted members *

1. The Committee has power to co-opt members in any city or town when necessary.

2. The co-option of members is with a view to enable the Committee to have the advantage of the special knowledge of such members regarding the peculiar conditions of the city, town or province concerned.

3. Co-opted members are expected to offer written memoranda of their views on the points mentioned in the terms of reference to the Committee and raised in the questionnaire issued by the Committee. If the Committee or the co-opted members so desire the written memoranda may be amplified or supplemented by their oral evidence.

4. Members co-opted in any city or town are expected to attend the sittings of the Committee in such city or town as members for the time being. They are also expected to be present at the interviews which the Committee may give to individuals or representative bodies or at the visits they may pay to institutions in such city or town.

5. While sitting as members they are entitled to participate in any enquiry held by the Committee by asking questions to the witnesses examined by the Committee or by offering witnesses for examination by the Committee.

6. A co-opted member is entitled to submit a report to the Chairman of the Committee at the close of the enquiry in the city or town in relation to which he is co-opted as a member and the Committee will have due regard to such report in drawing up its final report.

7. Co-optation is purely honorary in character and co-opted members are not entitled to anything by way of allowances or salary.

* Framed for the guidance of the co-opted members by the Committee.

APPENDIX B

Memoranda by Co-opted Members

(1)

Mr. A. Selvanayagam, M.P.S. (India), Co-opted Member for Madras

The import of drugs and chemicals of defective strength is common in this Presidency owing to the public and medical men patronizing the cheap drug stores who specially import them in convenient original packings, as the general public are of the impression that bottles containing original labels of European firms are a guarantee of quality. The prices charged are in many instances actual London prices, not taking into account freight, customs duty, etc. It is therefore not quite unreasonable to state that some of them at least are of defective strength. This is especially the case with expensive drugs such as quinine salts, iodides, citrates, mercurials, etc.

The following chemicals and drugs sold in the market are not B.P.:—

Calomel—Not completely free from perchloride.
Acid Boric—Not B.P.
Ferri et Quinine Citrate—(Less quinine).
Bismuth Carbonate—Containing 40 per cent instead 82 per cent.
Pot. Iodide—Adulterated with Pot. Bromide.
Iodoform—Adulterated with sulphur.
Oil of Aniseed—The market is flooded with synthetic preparation.
Oil of Eucalyptus—Does not pass B.P. test for cineol.
Oil of Cinnamon—Adulterated with Cassia Oil.
Oil of Juniper—The oil is distilled from the wood and not fruit.
Oil of Peppermint—The oil in the market is dementholized.

The following pharmaceutical preparations sold are of defective strength and not B.P. standard.

Spt. Etheris
Spt. Ether Nitrosi
Acid Hydrobrom dil
Acid Hydrocyanic dil
} Deficient in strength.

Extract Belladona—Deficient in Alkaloids.
All B.P. confections.
All B.P. liniments—Deficient in camphor.
Liq. Iodi Fortis—Deficient in iodine.

Pulv. Ipecac Co.
Pulv. Kino Co.
Pulv. Creta Aromat with Opii
} Deficient in opium.

Syrup Ferri Iodide—Deficient in iodine.
All B.P. Syrup—Made with sugar and saccharine.
All Mercury Ointments of B.P.—Deficient in mercury.
All wine preparations of B.P.—Not made with sherry.

It is usual for the drug stores to supply liniments of the B.P. made with methylated spirit, whether the medical man specifies it or not, while the patient has no knowledge of this substitution. Many supply Tinct. Iodine made with methylated spirit instead of B.P. preparations. The Pharmaceutical Society of India has presented a memorandum on the necessity of control over the B.P. drugs, especially poisons, by restricting the sale to qualified chemists or firms employing qualified men who can be depended upon to do honest trading. If this restriction is enforced, then the Pharmaceutical Society of India can take the responsibility of inspection of shops and bring the delinquents to task for any breach of the Act.

Preparations made from indigenous drugs.—These do not seem popular in this Presidency and there is very little sale of same. The only people who use indigenous drugs are Ayurvedic and Unani doctors. It will be very difficult to control their preparations.

In the interests of the public, however the indiscriminate sale of proprietary medicines supposed to be made from Ayurvedic or Unani prescriptions containing potent drugs and poisons, the formulæ of which are not disclosed, should be brought under control. There are a host of remedies recommended

as Aphrodisiacs or nerve tonics supposed to contain gold, musk and ambergris, but actually containing nux-vomica, damiana and phosphorus ; tonics for women's diseases which are more harmful than good. If it is not possible to control the same, they should be forced to disclose the formulæ on the bottles.

Synthetic and proprietary drugs.—The Madras market is flooded with synthetic and proprietary drugs chiefly from Germany, Switzerland, Austria, etc. Every man who does any import business tries to secure a medical agency and sends a free sample to all the medical practitioners accompanied by reports and a host of testimonials of a doubtful nature. The medical man believing these reports, prescribes these drugs to his patients. In many cases, the medicine is not available in any of the local shops with the result that often enquiries have to be made of the practitioner for the address of the manufacturers before it can be procured. It will be a good practice, if the medical profession will refuse to have any dealings with persons not connected with the medical profession or pharmacy.

Sale of disinfectants.—There is no restriction governing the sale of these products to the public with the result that the market is flooded with cheap disinfectants of doubtful value. The principal buyers are municipalities, district and taluk boards and Government offices. They do not buy on test of analysis, but the tender price generally decides the quality to be purchased. In the interests of the public, there ought to be some restrictions on the sale of disinfectants by the Director of Public Health by having the various brands analysed, and by getting reports on the same.

Sale of poisons by wholesale.—At present certain bazaar vendors are licensed to sell certain poisons to anybody requiring the same, the only restriction being that they should take down the name and address of the parties. This is very unsatisfactory and dangerous and, in the interests of the public, the bazaar vendors should be restricted to selling only poisons required for the pyrotechnic trade. The Ayurvedic and Unani medical men can easily purchase their requirements from the regular chemists.

Dangerous Drugs Act.—The aim of this Act was to restrict the use of dangerous drugs to *bona fide* medical purposes. To this end, special licences were issued to dispensing chemists and they were required to maintain elaborate accounts to check stocks and issues, while, to facilitate returns, they were asked to show drug contents of the issues and stock (the calculations being made to two places of decimals). Though this was very irksome and a number of chemists were fined 'not for breaches of the Act,' but for technical offences, the chemists as a rule co-operated with the authorities to restrict the sale for *bona fide* medical purposes. Unfortunately the licences were not restricted to qualified chemists only but everybody calling themselves chemists—qualified or not—were granted licences by the Excise authorities. There are instances, when a drug was refused in a regular chemist's shop, the party was able to get the same from the shops kept by unqualified men, who are more interested in doing any profitable business than putting restrictions on their sales.

Many of the medical men do not take out licences under the Dangerous Drugs Act, to cover their dispensing but avoid all the trouble and worry by taking advantage of the provision in the Act, which enables them to possess a certain quantity for their professional use. If the medical man wants to be rid of the worry and trouble of the licences under the Act, he should direct those prescriptions to a regular chemist's shop.

Restriction of dispensing to qualified chemists.—In Madras, the private medical practitioners have the majority of the professional practice and usually they dispense their own prescriptions. Unless they visit patients in their homes, they do not charge for professional services but make an inclusive charge when charging for medicine. Some of them, to ensure that the prescriptions are dispensed in their own establishment, are in the habit of using code words for some of the drugs known only to the practitioner and his compounder. Instances are known where the patient requiring the medicine urgently had gone to the regular chemists only to be refused. This practice is not fair to the patient or to the chemist who is there to serve the public. There is also a tendency to prescribe proprietary preparations, when there are equivalent B.P. preparations, making the prescription more expensive with the result that the poor patient has often to resort to the petty shops kept by unqualified people who charge cheap as they can substitute similar cheap drugs.

(2)

Dr. U. Rama Rao, Co-opted Member for Madras

For the purpose of this report, it will suffice if I take up the terms of reference to the Committee and discuss them in detail in the light of the evidence that has been tendered during the Committee's sittings at Madras and make my recommendations. The terms of reference to the Committee are—

(1) to enquire into the extent to which drugs and chemicals of impure quality and defective strength, particularly those recognized by the British Pharmacopœia are imported, manufactured and sold in British India and the necessity, in the public interest, of controlling such importation, manufacture and sale and to make recommendations;

(2) to report how far the recommendations made in (1) may be extended to known and approved medicinal preparations other than those referred to above and to medicines made from indigenous drugs and chemicals; and

(3) to enquire into the necessity of legislation to restrict the profession of pharmacy to duly qualified persons and to make recommendations.

Adulteration of drugs and chemicals of B.P. standard, imported, manufactured or sold in India.—It is abundantly clear from the oral evidence—

(1) that some of the drugs imported into British India are inferior in quality and defective in strength and do not conform to the standard prescribed in the British Pharmacopœia;

(2) that due to climatic, storage and other conditions obtaining in India, they deteriorate in quality and strength;

(3) that there is no control whatever exercised over the manufacture and sale of these products in British India.

Recommendations.—Control by legislation is absolutely necessary and how this control has to be effected is to be determined. The question now arises as to whether the adoption of British Pharmacopœia is suitable for all times and whether a beginning should not be made for the compilation of an Indian Pharmacopœia. India imports not only B.P. products but also German and U.S.A. products, besides manufacturing certain biological and other products in her own territories. These drugs and chemicals ought to be manufactured and tested in India and standardized, having due regard to climatic, storage and other conditions. They will all come under one pharmacopœia by the name of Indian Pharmacopœia. This must necessarily lead to the establishment of chemical laboratories in India. The Government of India ought to have long ago established these laboratories in India and their neglect has cost the public exchequer to the extent of nearly rupees half a crore annually. India can no longer depend on a country 6,000 miles away for drugs and medicines to save her suffering millions. I would therefore strongly urge the establishment of chemical laboratories and herbariums in each of the several provinces of India. These should form the media by which imported or indigenous articles of inferior quality and strength should be tested. Pending the establishment of such laboratories, the Calcutta School of Tropical Medicine or their nominees at other provincial centres might be called upon to undertake this task. Temporary expedients such as the estabishment of a Board of Control or some such agency will be of little avail as it will lead to unnecessary harassing and will prove like the Excise Department another scourge to the chemists and druggists. Penalization of offenders who import, manufacture or sell inferior products will be the only effective means of protecting the people from the hands of unscrupulous chemists.

The second item of reference to the Committee evidently refers to imported patent medicines and to indigenous medicines.

In my humble opinion, the importation of patent medicines must be banned entirely and restricted, if necessary, only to those preparations whose compositions are given on the label and whose efficacy has been sufficiently tested beforehand. The British Government in England impose a stamp duty on those secret medicines and that is a profitable source of revenue to them. In India, the Taxation Enquiry Committee have suggested a tax of four annas in the rupee in the case of indigenous practitioners who refuse to disclose their formulæ and an increase in the tariff rate to 50 per cent in the case of imported patent medicines. This may be alright

from the financial point of view so far as the Government is concerned, but is productive of no benefit whatever to the buyers. No patent medicine, indigenous or imported, should be advertised, unless the component parts are given on the label and the medicines tested at our chemical and pharmaceutical laboratories and approved as efficacious and harmless to the people. The majority of Indian patients are too poor to pay for and undergo a complete course of medical treatment; while so, it will be criminal folly on the part of the Government and the medical profession to allow them to be tempted by alluring advertisements in the lay and medical press and make them waste their money over useless patent medicines to the detriment of their health. So far as the indigenous practitioners are concerned, the evidence tended to show that they were quite willing to co-operate in the matter of standardization of their drugs. This indeed is a happy augury for the future of Indian medicine. Any legislation regarding patent medicines must proceed on the basis of the U.S.A. Act.

The third and last item of reference to the Committee is with regard to the restriction of the profession of pharmacy to duly qualified persons. I do not think that such restriction, though highly desirable, is immediately possible so long as India is unable to turn out large numbers of trained chemists and druggists. Wholesale chemists and druggists must necessarily engage a trained chemist to guide them in their business but in the case of retail chemists or dispensing pharmacies, qualified compounders will do for the present. Legislation in this regard is therefore unnecessary at this stage.

(3)

Dr. B. N. Vyas, Head of the Department of Pharmacology, Lucknow University, Co-opted Member for Lucknow

The Drugs Enquiry Committee arrived at Lucknow on the morning of the 7th November 1930 and held two meetings on the 7th and 8th of November in one of the Committee rooms of the Council Chamber Buildings. The Committee consisted of the following five members:

(1) Lieut.-Col. R. N. Chopra (Chairman),
(2) Mr. H. Cooper,
(3) Rev. Fr. J. F. Caius,
(4) Maulvi Muhammad Abdul Matin Chaudhuri, and
(5) Dr. B. N. Vyas (Co-opted Member).

The Committee examined twenty witnesses including sixteen medical men, two chemists and two hakeems. Twenty-five replies to the questionnaire issued by the Committee were received from the members of the medical profession, chemists and hakeems—17 from medical men, 7 from hakeems and 1 from a chemist. There were three classes of witnesses, namely, medical men, chemists and hakeems. Their evidence is therefore discussed under three different headings:—

A. Medical men—(1) *Quality of drugs and their preparations.*—Majority of witnesses who appeared before the Committee at Lucknow were of the opinion that drugs and biological products on Indian markets, both imported and manufactured in the country, were often of inferior quality and at times adulterated. There were two notable exceptions to this view, namely, Lieutenant-Colonel Scroggie, I.M.S., Officer Commanding, British Station Hospital, Lucknow, and Doctor (Miss) Douglas, in charge of the Lady Kinnaird Hospital, Lucknow. Both the witnesses stated that they had no fault to find with the quality of drugs obtained in Indian markets provided they were obtained from reliable firms. Later, they had to admit in cross-examination that they did at times meet with drugs which were often not up to the required standard. The drugs, of which the quality was complained of, were Quinine preparations of Digitalis, preparations of Ergot, Chloroform, Novocain, Spiritus etheris nitrosi, preparations of Belladonna and Aspirin. Opinion of most of the medical witnesses as to the inferiority and adulteration of drugs was based on clinical evidence only. Some of the suggested causes of the inferiority of the drugs in the Indian markets were (*a*) deliberate manufacturing of cheap drugs of inferior quality meant for Indian markets, (*b*) wilful adulteration in order to cheapen the cost and derive higher profits, and (*c*) bad storage (particularly in the case of biological products, tinctures, and extracts). As regards the storage of drugs, it was suggested that chemists who can afford to store them in

refrigerators should only be licensed to deal in biological products. A further suggestion was that tincture and other preparations liable to deterioration should have the date of manufacture mentioned on the label.

(2) *Necessity of legislation.*—Medical witnesses were practically unanimously in favour of legislation which would prevent adulteration and drugs of inferior quality being sold in the Indian markets. Only one witness—Dr. C. C. Bose—was of opinion that the time for such a legislation was not yet ripe. Majority of witnesses were of opinion that the proposed legislation should be so framed as not to stifle the growing industry of 'drug manufacture' in this country. With the exception of one witness, namely, Lieutenant-Colonel Scroggie, I.M.S., all the witnesses were of opinion that the legislation should be an all-India one to ensure the uniformity of standards throughout the country. They favoured the establishment of a central laboratory for the assaying of drugs and chemicals with provincial branches. Most of the evidence was in favour of restricting legislation to pharmacopœial drugs only. Mr. P. S. MacMahon, Professor of Chemistry, Lucknow University, suggested that the work of the central laboratory should consist of working out and laying down the standards of drugs. Assaying and testing of drugs could be carried out by the existing public analyst who should be provided with suitable staff. To meet the cost of the suggested central and provincial laboratories, it was suggested that a tariff of three pies per rupee should be levied. Such a tariff was not likely to be felt by the consumer.

(3) *Patent and proprietary drugs.*—All witnesses—doctors, chemists and hakeems—were of opinion that no proprietary medicine should be allowed to be sold on the market unless the exact formula of the same was given on the label and that legislation should include all proprietary and patent medicines, whether imported or manufactured in the country, belonging to any of the existing systems of medicines. No witness was in favour of increasing duty on proprietary and patent medicines as they all agreed that increase in price would not reduce the sale of such drugs. Lieut.-Col. H. Stott, I.M.S., Dean of the Faculty of Medicine, Lucknow University, and Lieut.-Col. G. T. Burke, I.M.S., Professor of Medicine, Lucknow University, asked for some legislation against fraudulent advertisements about cures, of which they gave several instances.

(4) *Indian Pharmacopœia.*—All the witnesses were in favour of the compilation of an Indian Pharmacopœia. They were of opinion that it should be based on the British Pharmacopœia with such modifications as were necessary on account of the peculiar climatic conditions obtaining in this country. Besides the pharmacopœial drugs, the proposed pharmacopœia was to include only those indigenous drugs which have been scientifically investigated and found efficacious.

(5) *Inaccurate dispensing.*—There was uniformity of opinion among the witnesses that cases of inaccurate dispensing were frequent and that legislation was necessary to restrict the profession of pharmacy to the duly qualified persons only. Witnesses were also unanimous about licensing of chemists' shops. It was suggested that there should be two grades of pharmacists—(1) pharmaceutical chemists with higher knowledge of chemistry and pharmaceutical work with preliminary education of the standard of a degree in science and (2) compounders and dispensers with practical training in compounding and dispensing for a year or two with preliminary education up to the Matriculation standard. Pharmacists of class (1) will have to receive training abroad till special institutions for the purpose are created in the country. It was also suggested that the existing State Medical Faculties could issue licenses for compounders and dispensers who could be trained in the existing medical schools under their control.

(6) *Foods.*—Very few witnesses were in a position to express opinion on the control of foods though they thought that the present Food and Drugs Act was not effective. In the opinion of Professor P. S. MacMahon, the amended Food and Drugs Act of the United Provinces was comprehensive enough to control adulteration of foods. But the other witnesses differed from this view. One witness was of opinion that foods should be controlled by the Department of Public Health.

B. Proprietors of chemical and drugs stores.—Two of these gave evidence. They both agreed that drugs of inferior quality were sold in the market and that legislative control was necessary. They were of opinion that the sale of proprietary medicines was on the increase. They agreed with medical men that medicines with secret formulæ should not be allowed to

be sold and those allowed to be sold should have their formulæ mentioned on the label. The proprietors of medical stores stated that no duly qualified dispensers and compounders were available and that the compounders and dispensers at present working in their shops were men with long experience in compounding and dispensing. They were prepared to pay higher wages if qualified dispensers and compounders were available. They agree that if an all-India pharmacopœia is compiled it will be very useful to them.

C. Hakeems.—Seven hakeems replied to the questionnaire and two of them appeared before the Committee to give evidence. They all stated that inferior and adulterated drugs were sold in the market. They stated that they would very much like to have some sort of legislation that could ensure purity of indigenous drugs. On cross-examination, they admitted that in the absence of any standard pharmacopœia and for want of knowledge of chemical composition of indigenous drugs and their preparations, it would be very difficut to have legislative control over the indigenous drugs as would be possible in the case of modern drugs. They agreed with the opinion of medical witnesses and chemists that patent drugs with secret formulæ should not be allowed to be sold. They suggested licensing of shops selling indigenous drugs and periodical inspection of the same by a trained man. They were of opinion that the Government should take up the cultivation of indigenous drugs in order to provide drugs of purer quality and suggested opening of depots for indigenous drugs by Government.

Summary (with regard to terms of reference).—(i) It is clear from the evidence produced before the Drugs Enquiry Committee at Lucknow that drugs and chemicals of inferior quality and defective strength are imported, manufactured and sold in British India and that it is imperative in public interest to control their importation, manufacture and sale.

(ii) The evidence tendered before the Committee favoured the restriction of the proposed legislation to pharmacopœial drugs and preparations and to those preparations from indigenous drugs which have been scientifically investigated. There is a clear demand for the compilation of an Indian Pharmacopœia. It was considered impracticable to include indigenous drugs and preparations within the scope of the proposed legislation or in the proposed compilation of Indian Pharmacopœia.

(iii) There was unanimous demand for legislation to restrict the profession of pharmacy to duly qualified persons.

Desire for an all-India legislation seems to be unanimous. From the evidence tendered before the Committee, it is clear that the proposed legislation should insist on uniformity of standards throughout the country and restrict the sale of drugs of inferior quality and defective strength. It should prohibit the sale of patent drugs with secret formulæ and ensure supply of pure foodstuffs to the public and, if possible, prevent advertisements of fraudulent cures.

(4)

Col. C. R. Bakhle, I.M.S. (Retired), and Dr. B. J. Sahni, Co-opted Members for Lahore

The desirability of an inquiry to control the indiscriminate use of impure and low standard drugs and to legislate for the standardization of the preparations and sale of such drugs is admitted. The subject is of paramount importance and some action to control the importation, manufacture and sale of such drugs in India is overdue. But at the outset we would urge that, if any legislative action is taken on the recommendations of the Committee now appointed by the Government of India, it should not prejudice the position of the infant drug industry of India. On the contrary, we are strongly of opinion that Government should undertake to protect and give every encouragement to the manufacture of drugs in India in preference to imported articles.

2. Drugs of the value of two crores are imported annually into India and the United Kingdom is one of the principal suppliers of Indian needs in the drug line. Although a Food and Drugs Act exists in the United Kingdom, it is unfortunate that the Act is not made applicable to export of drugs from that country.

It is well known that certain firms abroad manufacture drugs specially for the Indian market and, in the absence of any control on the quality of drugs manufactured for export, these countries are able to undersell local

manufactures by lowering the standard of quality. This dumping of inferior quality goods has its repercussion on the quality of locally manufactured articles in that their quality deteriorates to keep pace with the competitive rates of these dumped goods.

The United States of America have a better type of legislation in that they do not discriminate between drugs manufactured for use locally and for export and the provisions of the Act as regards strength and quality are applicable to both alike.

3. The Committee are already aware that to analyse and standardize medicinal preparations requires experienced men and expensive and elaborate laboratory equipment. It follows therefore that the creation of well-equipped laboratories and test houses in different parts of India under impartial and competent men who enjoy the confidence of the public is a condition precedent to any legislative action.

'Pure Drugs Act' when one is passed need to be an all-India Act, Foods Act being left to be passed by local legislatures according to their separate provincial needs.

For effective control of drugs and chemicals, it would be desirable to have one central authority in a central laboratory with a number of provincial branches. The central laboratory may be located in the principal centre of import and the branch laboratories at other provincial centres.

These should be in charge of experts in chemical analysis as well as in bio-chemical method of testing of drugs.

Officers-in-charge should be recruited for their special qualifications and in no case should this important work on which the fate of the future drug industry of India largely depends be entrusted to chemical analysers of Government simply because they are in Government service and have certain laboratory facilities.

Testing the quality and strength of drugs is specialized work which should remain only in the hands of experts.

At present there are no State pharmaceutical laboratories which undertake the sampling of raw materials. By establishing such laboratories, the medical profession, the consumer, and the manufacturer alike will be benefited, as, in addition to analysing imported drugs, they would be able to test raw materials obtainable in the country and assess their quality with a view to guide the local manufacturer.

Not much information is at present available as to the extent or nature of deficiency in quality of the raw materials available in the country.

The manufacturer is thus handicapped, on the one hand, by the doubtful quality of the imported drugs and herbs and, on the other, from lack of information regarding the suitability or the strength of the raw materials produced in the country.

4. There can be no two opinions as to the desirability of controlling the drug trade but before this can be profitably done the ground has to be prepared.

Much spade work is necessary in the shape of establishing a pharmaceutical society with a central and provincial laboratories, undertaking research work and fixing standards suitable to the requirements of this country.

5. The compilation of an Indian Pharmacopœia, intensive research work and the fixing of standards of herbs and drugs should, in our opinion, precede legislative action.

In the compilation of such a pharmacopœia, three categories of drugs will have to be incorporated:—

(1) Drugs and preparations taken from pharmacopœias of other countries.

(2) Indigenous drugs which have already been studied and standardized.

(3) Drugs found efficacious on clinical trial but which await further investigations.

In this connexion it should be noted that the Western or Allopathic system of medicine is availed of by a small fraction of the total population of India, the masses depending chiefly on the indigenous systems.

Unless standards are laid down for the Unani and Ayurvedic drugs by those competent to deal with the subject, any action taken to control drugs in general, will result in failure.

The work of compiling an Indian Unani and Ayurvedic Pharmacopœia should be entrusted to a board of noted vaids and hakeems. Such a board would be best qualified to lay down tests for most of the Ayurvedic and Unani drugs in common use.

6. If the health of the people is to be safeguarded, the profession of pharmacy should be restricted to qualified persons. The term 'Profession of pharmacy' should be interpreted in a wide sense and include three classes of persons, viz.:—

(1) Pharmaceutical chemists.

(2) Chemists and druggists.

(3) Compounders or dispensers.

For the proper training of such individuals a 'College of Pharmacy' with a research department should be established in each provincial capital city. A suitable curriculum for each of the above three classes can be drawn up.

7. A beginning can be made with the training of compounders without much additional cost to the State.

Advantage may be taken of the existing medical schools and colleges and instructions in pharmacy, compounding, first aid and dressing can be arranged therein to be given by a special staff of teachers.

The minimum qualification required for admission to this class should be the Matriculation or an equivalent test. The training course should extend over a period of one year or 18 months, at the end of which period an examination should be held. Those who succeed in passing the necessary tests should receive a diploma and be entitled to register as qualified to follow the profession of compounding. No Government, district board or municipal institutions should be permitted to employ anyone who does not hold a registrable qualification and whose name is not borne on the register.

8. The establishment of a 'College of Pharmacy' should, however, not be lost sight of. As soon as such a college is opened, the work of training compounders should be transferred to that institution so that the creation of a body of trained compounders, chemists and scientific pharmacists may be co-ordinated.

9. Druggists or chemists should be licensed and no licence be issued unless the firm can prove to the satisfaction of the Pharmaceutical Society that the concern is manned by a competent and trained chemist or chemists and has on its dispensary department trained and registered compounders.

10. The Colleges of Pharmacy should in our opinion be run under the guidance and supervision of the Central Pharmaceutical Society which is proposed to be established. The Central Society may be trusted to draw up rules regarding storage of sera and other biological products to ensure purity and to guard against loss of potency which may occur on account of the peculiar climatic conditions of India.

11. There should be absolute prohibition of the import into the country of any patent or proprietary agent which does not in clear terms state the composition on the label and which does not bear a certificate of guarantee of purity and potency and the date of manufacture from a competent authority of the country of manufacture. Similar precautions should apply to goods manufactured in India.

12. To sum up, the following steps appear necessary to ensure effective control.

The creation of a Pharmaceutical Society which should act as the central controlling authority.

The society should be entrusted with these following duties:—

(1) Supervise the training given at Colleges of Pharmacy to be established in provincial capitals.

(2) Supervise and guide work at the Central Laboratory where analysis of drugs, chemicals and herbs, both imported and indigenous, should be carried out and research work undertaken.

(3) Fix standards of indigenous raw materials for guidance of manufacturers.

(4) Take steps to compile an Indian Pharmacopœia with an addendum for Ayurvedic and Unani medicines in common use.

(5) Periodically issue bulletins acquainting the profession with the progress of research in various branches and supply such information to manufacturers and provincial laboratories as they may be in need of.

(6) Maintain a register of qualified compounders, druggists, pharmacologists and pharmaceutical chemists.

The Pharmaceutical Society should have a non-official president and representatives of Government, the independent medical profession, manufacturers of biological products, manufacturing and dispensing chemists, the drug trade and experts in pharmacology, botany, chemistry and bacteriology.

(5)

Mr. S. Sen, M.Sc., Factory Superintendent, Bengal Chemical and Pharmaceutical Works, Limited, Calcutta, Co-opted Member for Calcutta

As required by the rules relating to the functions of a co-opted member, I have the pleasure in giving below my observations on the terms of reference of the Committee and on the points raised in the questionnaire.

I attended the sittings of the Committee in Calcutta from 1st to 6th, 10th to 13th and 17th December 1930 and was present throughout during the oral evidences of the witnesses.

Adulteration.—It has been amply proved from the written replies to the questionnaire as well as from the oral evidences of the witnesses who appeared before the Committee that the extent of adulteration of drugs and chemicals that are offered for sale in Indian market is very large. I am giving below a few glaring instances of adulteration which have been found in the course of every day work in our analytical laboratory:—

Potassium Iodide—Mixed with Bromides and also Iodates.

Potassium citrate and Sodium citrate—Contains lower percentage of citrate. Sometimes contains nitrates and sulphates.

Saccharin—Mixed with starch and sugar.

Santonine—Mixed with boric acid.

Ferri et quinine citrate—Have got low quinine content.

Acid Salicylic—Mixed with starch and boric acid.

Ipecac—Emetine partially extracted.

Cloves, ginger—Partially distilled.

Saffron—Mixed with some fibres dyed with coal tar colours.

Pulv. Ipecac Compound—Made with extracted Ipecac.

Extract Ergot Liquid—Inactive.

Tinct. Iodine—Having lower Iodine content.

Solid extracts.—Solid extracts imported in Calcutta market are generally of very inferior quality. These are classed 'commercial,' 'best commercial,' etc.; on analysis many have been found to be of very low alkaloid content—sometimes even less than 50 per cent. Finely powdered drug and sugar of milk are frequently mixed in large proportions to increase the bulk—

Sandalwood oil—Mixed with cedarwood oil and sometimes with mineral oil.

(A well-known Calcutta firm sells sandalwood oil at Rs. 7 per pound.)

Oil Peppermint—After extracting Menthol.

Oil Cajuput and Oil Eucalyptus—Mixed with camphor oil and turpentine oil.

Oil Anisi—Does not contain anisi oil.

Oil Juniper—Mixed with oil camphor.

(Juniper wood oil is also sold as Oil Juniper B.P.)

Oil Cinnamon B.P.—Mixed with Oil Cassia and sometimes wholly Oil Cassia.

Surgical dressings.—Cotton wool made from very inferior quality of cotton wastes and possibly from waste linens are largely exported to Indian market and are sold as 'absorbent cotton' at very cheap rates, which are sometimes less than the cost of raw cotton itself. These are actually injurious for surgical purposes. It can be easily found on examination that it has got no strength of fibres and is positively harmful for dressing. But there are several brands in the market imported by unscrupulous dealers who have been able to create a demand for these worthless stuffs simply on account of the low prices.

These are only a few cases and there are many other instances of gross adulteration. In the course of his evidence Mr. Tilden of Messrs. Strafford Allen & Co. showed a packet labelled Bismuth Subnitrate (packed in Bombay) which he said contains calcium carbonate.

Necessity for a Drug Act.—To protect consuming public against adulterated, misbranded and harmful drugs and to guard honest manufacturers against unfair competition with such articles some kind of legislation for controlling the purity of drugs, manufactured in India or imported from foreign countries and sold in Indian market, is necessary.

The provisions of the Drug Act shall be such that it will be a penalizable offence to manufacture, import and offer for sale any adulterated, misbranded or harmful drugs.

The Drug Act shall be applicable to the whole of India including Native States. The final control shall be by the Central Government with provincial organizations for enforcing the provisions of the Act. The Central Board of Control should have a laboratory under their guidance to carry out testing and analysis of drugs and chemicals.

A set of standards for all drugs consumed in India must be determined first of all and laid down as legal standards. In fixing these standards, due consideration should be given to the local climatic conditions, nature of the raw materials available in this country and the experience of clinicians and pharmacologists regarding other conditions specially prevalent in India.

Manufacturers shall be required to take a licence from the Board of Control by satisfying that body that they have got proper machinery, equipment and staff necessary for the manufacture.

Dispensing chemists shall be required to employ qualified assistants for dispensing. For the present, passed compounders may be recognized as qualified assistants, but proper steps be taken for thorough training in pharmacy, as soon as possible, on the lines prevalent in Great Britain.

Indian Pharmacopœia.—The compilation of a pharmacopœia for India is a matter of urgent necessity and should be taken up immediately. For the present, Indian Pharmacopœia may be composed of the following:—

(1) Necessary preparations from British Pharmacopœia.

(2) Such preparations from other foreign pharmacopœias as may be suitable for Indian conditions.

(3) Preparations from Indian indigenous drugs which have been scientifically investigated and standardized and which will be similarly investigated from time to time.

(4) Preparations of indigenous drugs which have been found to be efficacious by actual trial by physicians for a long time. Some of them may require further investigation and trial and the methods of preparation also may have to be studied further.

As in foreign countries, for the compilation of Indian Pharmacopœia a committee of experts consisting of eminent medical men, practitioners of Ayurvedic medicines, pharmacologists, physiologists, botanists, pharmaceutical chemists and pharmaceutical manufacturers shall have to be appointed for working out details.

Medicines of Indian indigenous drugs and proprietary medicines.—Until and unless the methods of preparation and properties of medicines used in Ayurvedic practice are fully investigated no efficient control is possible on these in the same way as it is done for pharmaceutical preparations. As soon as correct manufacturing processes and suitable standards will be worked out it will be possible to exercise similar control. All the same, some action is necessary to prevent absurd claims for the virtues of certain medicinal products including those of the Ayurvedic and Unani medicines.

Proprietary medicines with secret formulæ, both locally made and imported from foreign countries, should not be allowed to be sold. Manufacturers must be compelled to declare the composition of the preparations and print the same upon the label or elsewhere in the package. Provincial Boards of Control may issue circulars from time to time giving their results of analysis and opinions regarding proprietary medicines for the information of medical men and consumers as well.

The chief difficulties of manufacturers in Bengal regarding manufacture and sale of pharmaceutical products

Procuring raw materials

It is always very difficult to obtain indigenous raw materials of standard quality and it is often found that many drugs are grossly adulterated. There is no reliable organization in India for the collection of drugs in proper manner with adequate arrangements for drying and storing. Except for a small number of items which are obtained from the Kashmir State Forest Department, the trade in crude drugs is mostly carried on by private individuals and middlemen who, partly due to their ignorance of the subject and partly due to the want of any kind of control on the quality of the drugs, deal with adulterated and inferior quality of drugs.

Crude drugs imported in India from foreign countries are also no better. Most probably exporters think that India can consume any 'worthless stuff' and all sorts of inferior quality of drugs are freely exported to India. The Food and Drugs Act prevalent in European countries does not prevent this for, in case of exports to other countries, the Act requires that the articles should satisfy the drug laws of the importing country.

Consequently a manufacturer who has to procure the proper quality of raw materials has to be very careful regarding the selection of the supplier and elaborate examination is necessary before accepting a consignment. For this purpose, a properly equipped laboratory and a large staff of trained chemists have to be maintained. This is an expensive item and materially adds to the cost of manufacture.

India possesses vast resources of medicinal plants but the sources of supply have not been fully explored. Some Government control over the collection and distribution of drugs is necessary and this can be effected in the following ways:—

(1) Assistance from the experts of Government Botanical Survey Department for educating and helping the growers and collectors of drugs as to the proper method of cultivation, collection and drying.

(2) Creation of a central Indian market for the sale of drugs. The drugs collected in different parts in India are to be sent to this place and will be subject to inspection by Expert Government Inspectors before sales are effected.

(3) Introduction of special reduced railway freight rates for drugs required for *bona fide* manufacturing purposes in India from the centres of production to places of manufacture.

(4) Some effective means for breaking the monopoly system or undue profiteering may be adopted. It sometimes happens that prices of some drugs grown in India are cheaper when purchased from the London market.

Excise regulations

Restrictions regarding export to certain provinces in British India.

The excise duty on spirit required for medicinal preparations is the same in all provinces and consequently any spirituous medicinal preparation upon which duty has been paid to the Excise Department should be free from any restriction regarding export from one province to another. But the Excise Departments of Bombay and Madras Governments have imposed certain restrictions regarding the import of medicinal preparations from other places to their provinces. These Governments collect duty on spirituous goods exported to their provinces and have developed elaborate procedure

regarding issue of import permits and collection of duty on arrival of the goods at destination. The matter being very important, I am giving details of procedure which importers in these provinces have to follow:—

Procedure for Bombay.—An importer who wants to import spirituous medicines from other provinces has in the first place to obtain an Import Permit from the local Excise authority. For this purpose he has to apply to the Excise Office mentioning therein the alcoholic strength of each preparation and correct amount of duty for the consignment. The Excise Authority thereupon grants the Permit either on prepayment of duty or conditional upon payment of duty by the exporter and subsequent transfer of the same to the Bombay Revenues by the Government of the exporting province. On arrival of the goods at destination, samples of every item are taken for analysis before the importer is allowed to clear the goods and are sent to the Government Laboratory at Nasik for analysis and valuation of duty. The Bombay Excise Department do not accept the certificate of duty by the Excise Officers of the Bengal Government. Any difference between the amount of duty paid before and that calculated after analysis has to be adjusted by the importer subsequently.

The above regulation is for the Bombay City. But in the case of inland towns, the matter is even more difficult. In the case of most towns, for lack of proper Excise arrangements, it is not always possible to obtain necessary Import Permit and consequently it becomes absolutely impossible to despatch spirituous medicinal preparations to those places at all.

Procedure for Madras.—For the Madras City and port towns of Madras, spirituous medicinal preparations are sent *under bond* by sea. i.e., without paying the duty at the place of manufacture. The duty is collected on arrival of the goods at the port by the Customs authorities (on behalf of the Excise Department) at the time of the clearing of the consignment from the jetty.

But in the case of inland towns, the system is very complicated. The importer has to apply to the Commissioner of Excise, Madras, for permission to import from other provinces. In the application he has to mention the correct amount of duty for the consignment. (For this purpose the importer has to send the order to the supplier who only is competent to evaluate the amount of duty.) Upon receipt of this statement and the amount of duty in advance, the Excise Commissioner grants the import permit and sends intimation to the Excise authority of the exporting province.

From the above it will be seen how complicated, troublesome and expensive it is for a manufacturer in Bengal to export spirituous medicinal preparations to Bombay or Madras, although there is a considerable demand for such products. In the case of spirituous preparations imported from foreign countries, there is no restriction whatsoever regarding export from one province to another, once the duty is paid at the port of landing. It will thus be found that spirituous medicinal preparations of foreign manufacture can be sent from Calcutta to any place in India without the least difficulty but similar goods manufactured in India cannot be sent to Bombay or Madras without considerable difficulties while in the case of certain inland towns of these provinces it is impossible to supply such goods at all.

These restrictions regarding interprovincial exports of medicinal preparations within British India are a great disadvantage to the manufacturers for pushing the sale of their products even when there is a demand and are keenly felt by all manufacturers, at least in Calcutta.

I beg to submit that duty on spirituous medicinal preparations should in all cases be collected at the place of manufacture by the Excise Department of that province and there should not be any restriction regarding export from one province to another in British India when the excise duty is once realized. From the statement of exports to different provinces by the manufacturers duly checked and certified by the Excise staff attached to the bonded laboratories, duties on preparations exported to different provinces can be accurately calculated. These can be adjusted as necessary between different Provincial Governments by subsequent book transfer.

I would like to bring to the notice of the Committee a few other points in the Excise regulations which add to the many difficulties of the manufacturers in Bengal:—

(1) The special concession rate of duty on spirit is only for that required for the manufacture of medicinal preparations. A manufacturer

cannot get spirit even at concession rate of duty for any experimental or research work. Such experimental work is frequently necessary for making improvements upon existing methods of manufacture and for devising proper methods of extraction of new drugs. For such work the manufacturer has to get spirit after paying full tariff rate of duty.

(2) For some industrial purposes, such as the manufacture of alkaloids and similar preparations, alcohol is required as solvent. The Excise Department do not allow the privilege of concession duty for the spirit required for the manufacture of such preparations.

(3) The entire cost of supervision of the bonded laboratory together with leave and pension allowances is realized from the manufacturer. The manufacturer has to pay full amount of duty on the spirit it consumes and, in addition, the levy of charges of the Excise establishment necessary for the realization of duty is a real hardship to him.

Competition with inferior products

It is a well-known fact that a large number of drugs which appear for sale in the market have not always the therapeutic activities they are expected to possess. Some preparations have been found to be of defective strength both in their spirit content and percentage of active ingredients, while there are some which are made from impure materials or mixed with foreign or inert matter. Those kinds of defective preparations have been found alike among products manufactured in India and those imported from foreign countries. All these have been possible owing to the fact that there is no law in India to prevent the manufacture and sale of adulterated or harmful drugs. In Calcutta, the Corporation of Calcutta can exercise control over adulteration of drugs as under the Calcutta Municipal Act of 1923 it is an offence to sell adulterated drugs, but unfortunately no such control has been exercised up to the present time.

There is a tendency among dispensing chemists to go in for cheap products—they seem to be satisfied if they find the words 'B.P.' printed on the label and do not care to enquire whether the articles they purchase are prepared according to B.P. method and properly standardized or not. This is taken advantage of by many unscrupulous manufacturers and, as there is no control whatsoever over the quality of preparations offered for sale, there are so many brands of defective preparations in the market.

There are some small manufacturers in Calcutta who have been allowed by the Excise Department to manufacture medicinal preparations by purchasing spirit at concession duty without maintaining the Excise establishment like the bonded laboratories. In such cases there is no proper excise control over manufacture and there is no check over the spirit content of preparations they manufacture. In many spirituous preparations the value of the drugs is small in comparison with the value of the spirit used and we have reason to believe that these manufacturers often use less spirit than is required in B.P. in manufacturing tinctures and other medicinal preparations, turning out preparations which are defective in spirit content and percentage of active ingredients. They are thus able to offer their inferior products at cheap rates and labelled as B.P.

In Bengal, the Excise Department controls the spirit content of preparations manufactured in bonded laboratories but the control of the Excise Department ceases as soon as the duty is realized and goods are issued from bonded stores. There can be adulteration without any fear of excise interference in the following ways:—

(1) By taking delivery of the articles in bulk from a bonded laboratory and rebottling the same after dilution or adulteration and labelling the bottles under a different name.

(2) By exporting goods in bulk to other provinces where there is no excise control over the spirit content of preparations and bottling the goods, on arrival at destination, after dilution or adulteration.

There is a minimum cost of production of pharmaceutical preparations made and standardized strictly according to B.P. processes and it so happens that many products so prepared do not fetch the normal value owing to the prevailing low rates of understrength preparations. A manufacturer who does not care for quality and turns out low standard preparations can

reduce his prices considerably. This 'under-selling' by offering defective preparation is going on so extensively that it has become a cause of serious danger to honest manufacturers and some protection from Government has become a real necessity.

Government support necessary for protecting Indian pharmaceutical manufacturers

In my opinion, for the purpose of encouraging Indian pharmaceutical industries and enabling them to stand in competition with powerful foreign manufacturers, some Government help can be given in the following ways:—

(1) Introduction of a 'Pure Drugs Act' in India whereby it will be a penalizable offence to manufacture and sell adulterated or misbranded drugs.

(2) Present rate of duty on medicinal spirit shall remain undisturbed. For industrial purposes where alcohol is required as solvent as well as for experimental and research purposes by *bona fide* manufacturers, provision be made for allowing spirit *free of duty*. Charges for Excise establishment for bonded laboratories shall not be realized from manufacturers.

(3) Crude drugs as well as important chemicals required for *bona fide* manufacture of medicinal preparations should be free of custom duties. For crude drugs grown in India, special reduced railway freight from the centre of production to place of manufacture be introduced.

(4) Drugs and chemicals, which are generally used for medicinal purposes, that are offered for sale in Indian market, whether locally made or of foreign manufacture, shall always be of B.P. quality and must be labelled as B.P. Any such product which is not of B.P. quality nor clearly marked B.P. in the label must not be allowed to be imported or offered for sale in the market.

(5) All Government requirements of medicinal preparations shall be obtained from Indian manufacturers as far as these are made in India. Indian manufacturers are fully able to supply all Government demands with standard quality products and a great impetus will be given to these industries if Government get all their supplies from them instead of manufacturing themselves.

(6) The following are some of the drugs which can be easily manufactured in India on a large scale from purely Indian raw materials. The only difficulty is that the Indian industries cannot stand in competition with long established foreign manufacturers who can reduce their rates unlimitedly to crush a possible rival manufacturer. Given some tariff protection or some sort of bounty at least for a certain period these industries can thrive well:—

Magnesium sulphate from India magnesite obtained from the Salem district (Madras Presidency).

Strychnine from nux-vomica seeds.

Caffeine from tea wastes.

Thymol from Ajowan.

Quinine from Indian cinchona bark.

(6)

Dr. Kartick Chandra Bose of Doctor Bose's Laboratory, Limited, Calcutta, Co-opted Member for Calcutta

Permit me at the very outset to thank you, and through you, all the members of your Committee, for nominating me as a co-opted member while your Committee held its sittings in Calcutta.

2. During my attendance as a co-opted member, I have had ample opportunities of making myself acquainted with the views of the witnesses through their written answers to questionnaires as well as the replies they orally gave to the questions put by the members of the Committee.

3. I beg to submit herewith my report as a co-opted member, in obedience to the requirements of clause (6) of the rules laid down for co-opted members. In doing so, I have divided the report into three parts:

Part 1 deals with the disadvantages under which manufacturing chemists are now working, as regards raw materials and Excise regulations and the facilities which ought to be granted by the Government in order that they may get wider scope and be in a better position to make India independent as regards her entire medical supplies.

Part 2 deals with the difficulties, which the medical profession and the suffering public in this country have to experience in the matter of adulterated drugs and chemicals and with purposely understrength B.P. and like preparations imported from foreign countries or put up in India. It also contains suggestions as to how the consuming public may be protected against these adulterated, understrength and harmful drugs by the passing of an Indian Drugs Act by the Imperial Government which shall be applicable throughout the Indian Empire.

Part 3 deals with the compilation of a standard, authorized Indian Pharmacopœia as a necessary corollary to the proposed Indian Drugs Act.

I have tried to be as brief as possible so that the Committee may go through it and do justice to my humble suggestions.

Part 1.—Difficulties of manufacturing chemists and pharmaceutists

(Under this caption I also include my personal views as a manufacturing pharmaceutist.)

1. *Paucity of reliable raw materials.*—We have great difficulty in obtaining raw vegetable materials of Indian origin, as there is no Government control over, nor is there any statutory or even reliable organization for, properly growing to the standard of potency and reliably collecting and selling them. We have therefore, nolens volens, to rely on illiterate drug-dealers, who, for want of adequate knowledge of the subject, cannot very well recognize adulterations and inferior quality in the drugs. Some drugs like digitalis, belladonna and hyoscyamus are being collected from forests by the Kashmere State or are being cultivated by other Governments but, even then, variations in alkaloidal and glucoside contents have been also noticed in them. Crude drugs imported into India from foreign countries, have been found in many cases worthless and inactive, probably for having been robbed of their contents before import. This may be due to there being no Government restrictions as to the importation of inferior quality drugs and chemicals into the Indian market. This importation of inferior quality drugs and chemicals should be stopped once for all by the passing of an all-India Drugs Act.

Such being the difficulties in the way of getting genuine raw materials, manufacturing chemists have to be very careful in the matter of getting their supplies of drugs. Even then, each and every drug purchased after scrutiny has to be analysed first; and that means the maintenance of an army of trained chemists, a costly and fully equipped laboratory and duty-paid alcohol; and all these mean additional expenses saddled to the actual cost of manufacture.

There grow widely in India innumerable medicinal plants. They require careful scientific cultivation in hospitable soils and climates suitable for their cultivation. A preliminary scientific and comprehensive survey of the prevailing conditions as well as of the best means of advantageously cultivating the useful medicinal plants should be undertaken at once by the Government, in accordance with the needs of the proposed pharmacopœia. The Committee to be appointed for this purpose should also describe the available drugs in detail and should also definitely and clearly state the habitat and cultivational characteristics of each drug to be included in the pharmacopœia, for the informations and guidance of the people of the country. Under the same Indian Drugs Act, facilities are to be granted by the legislature to registered companies, corporations or private individuals working with Indian capital and labour for starting drug plantations in places where drugs can be most advantageously grown and facilities for such purposes should be granted to acquire lands or to grant leases on easier terms. This facility, if granted by the Provincial Governments to the registered and *bona fide* drug growers with Indian labour and capital, will materially help and ensure a steady supply of raw materials of the right quality in India.

Transportation charges on drugs form another very heavy item. The railway freight is often-times more than the actual value of the article; so, a reduced special tariff for movement of crude drugs should be secured by Government from the Railway Board.

2. *Difficulties with excise regulations:—(a) Excise establishment charges.* —In order to give an idea of the difficulties which we as manufacturers (Doctor Boses's Laboratory, Limited) have experienced till now, a brief history of our establishment, is appended herewith as typical of what actually occurs in this country.

On 13th January 1915, permission was obtained by us to start an experimental distillery, under Government control, to study fermentation, distillation and rectification processes in the manufacture of rectified spirit. This was worked for three months.

In June 1917, permission was obtained to manufacture medicinal preparations containing spirit under bond. For so doing, we had to pay establishment charges for the Government Excise staff located on the premises, amounting to about Rs. 150 a month. This we had to incur for some months.

In October 1917, we completed the erection of a distillery plant and started manufacturing alcohol. The bonded pharmacy and the distillery were together placed under the same excise staff. Exemption from payment of Government Excise establishment charges was granted to us, under rule 6, page 140, Excise Manual, Volume 1, as 5 per cent of the total amount of duty paid by us to the Government always exceeded the actual Excise establishment charges we had been hitherto paying. So, we had not to pay any establishment charges up to 1925, when, on a representation being made by the later bonded manufacturers (who had to pay the Excise establishment charges under rule 22, page 145, of the same Manual), the then Excise Commissioner deprived us of the privilege we had been hitherto enjoying, on account of ourselves manufacturing rectified spirit solely for medicinal and scientific purposes.

Thus ended the little facility that was granted to us in a distillery, started during war time, before any of the present huge distilleries manufacturing spirit mainly for liquor traffic was in existence.

Such is the history of alcohol manufacture by Doctor Bose's Laboratory, Limited. This we have to keep up only for manufacture of alcohol for medicinal and scientific purposes, even at a considerable loss, as we are to pay the establishment charges amounting to about Rs. 300 per month on our small output.

I hope that your Committee will recommend to the Government for removal of all Excise establishment charges, in the case of registered *bona fide* drug manufacturers working with Indian capital and labour.

(*b*) *Inter-provincial trade.*—In this matter, we are a great deal handicapped and suffer monetary loss and great inconveniences, due to difference in Provincial Excise regulations. The movement of spiritous medicines from Bengal to Bombay and Madras, is beset with unnecessary harrassments and expenses. Here, we do not go through minute details of the difficulties but barely refer to their broad outlines only. The Excise duty, in cases of such inter-provincial movements, has either to be prepaid or is realized at destination at the time of clearing the goods; and in the latter event additional charges in the shape of bonds on stamps at 1¼ per cent of the total amount realizable are to be submitted for the amount of duty and the goods are to be sent under customs supervision. Such restrictions on the free movements inter-provincially of indigenous trade are greatly to the disadvantage of the manufacturers of Indian industry. There is, be it noted carefully, no such restriction in the case of imported spirituous goods which may be sent freely and unhampered anywhere and everywhere in British India. The duty on spirit intended for medicines being the same all over India, the Excise regulations should also be alike and there should be no restrictions or additional burdens whatever on inter-provincial trade. Provisions should be made for realization of excise duty on spirituous medicinal preparations at the place of issue from the manufacturers and then such goods will have unhampered movement all over India.

There are also other difficulties regarding exportation of certain other excisable drugs (e.g., those containing opium and morphia) as the custom regulations vary widely with Excise regulations in different provinces. This should be made alike all over India.

All research and analytical works carried on here are very expensive, for the simple fact that we are to do all experiments and analytical works with duty-paid spirit. Government should allow spirit to analytical and research chemists free of any duty.

Part 2.—Adulteration and drugs of inferior quality

From replies to the questionnaires, as well as the oral evidences of the witnesses examined, we came to know that a huge amount of adulterated drugs are being openly and extensively sold in India.

Although there are some provisions for prosecution in the Calcutta Municipal Act and the Bengal Municipal Act, these are lying as dead letters as there is no fixed standard of purity laid down for any drug on which to proceed, nor is there an adequate number of staff available even in Calcutta to carry on these prosecutions. Therefore, to ensure purity of drugs an Indian Drugs Act is imperatively needed.

The Indian pharmacopœia to be statutorily published under the proposed Indian Drugs Act, like the pharmacopœias of the western countries, shall contain explicit and detailed descriptions, tests and standards of purity of each and every drug and preparations thereof. The first Indian Pharmacopœia shall be the standard guide for all manufacturing chemists and druggists throughout India.

Part 3.—Pharmacopœia Indica

I have hinted that the passing of an all-India Drugs Act is an imperative necessity; and I have also hinted that there should be provisions in that all-India Act for the publication, as soon as feasible, either of an all-India Pharmacopœia or, in the first instance of several different Provincial Pharmacopœias, simultaneously. If an all-India Pharmacopœia is to be issued, it should contain a proviso authorizing different provinces to issue supplemental local pharmacopœias. For purposes of my recommendations, I shall keep in view an all-India Pharmacopœia and suggestions made therefor shall apply equally to Provincial Pharmacopœias.

The following subjects should be included in the pharmacopœia:—

(1) Such drugs and preparations of the British Pharmacopœia as have been found suitable and useful for India.

(2) Such preparations from other foreign pharmacopœias as may be deemed suitable for India.

(3) Such indigenous drugs (animal, mineral and vegetable) from Ayurveda, Yunani or Hakeemi treatises as are being used in this country for ages and have stood the test of clinical trials.

The standard of purity and chemical tests for every drug should be laid down. In the section describing the vegetable indigenous drugs the following items should be clearly set forth:—

(i) A true and detailed scientific description of each materia medica.

(ii) Vernacular names of each, as prevalent in the different provinces in India.

(iii) Habitat, i.e., the places where the drug plants grow naturally or are cultivated. Specific mention should be made of cultivational characteristics, if any, of the parts of the plant useful in medicine; of the season during which the collection should be made to get the properly matured drugs; and of the way in which it should be stored.

(iv) Chemical composition of the drugs should be given as clearly as possible and special mention should be made of the active principle or principles of the drugs, if any. A standard of potency is to be fixed, on the basis of the presence of the alkaloids or glucoside or whatever it may be. For making the drug official in the Indian Pharmacopœias the lowest and highest standard of potency (limit of potency) should be clearly laid down as well as the form in which it is to be used medicinally.

(v) Toxicity, i.e., safety limit of pharmacological activity should be laid down as far as possible, and the relation of toxicity to the percentage of the active chemical ingredients present in a drug should be laid down, if and where possible.

(vi) *Therapeutic uses.*—Although it is not customary with the pharmacopœias of other countries, to give the action and therapeutic indications, I think it is imperatively necessary in our first venture to include these in small types (with references to standard works). This will help the medical men using the Indian grown drugs with confidence thereby paving the way to make India independent about her medical supplies in the future.

(vii) *Publication.*—The pharmacopœia should be published in English. Every qualified medical practitioner should have the right freely to publish, translate and annotate it.

(viii) An appendix should be included describing the modes of preparations (such as pulverisation, extraction, decoction, infusion, etc.). Description and illustrations of small handy appliances that can be manufactured here should be included.

By introducing this chapter on magisterial pharmacy, great impetus will be given to the medical men to make their own preparations from crude drugs at a nominal or no expense.

APPENDIX C

Special memoranda and extracts from answers

(1)

By the Bombay Medical Union, Bombay

I have the honour to acknowledge receipt of your circular letter, dated the 2nd September 1930, with a copy of the questionnaire issued by your Committee for the members of the medical profession, and to say that the question under reference has often been discussed by my Committee as well as by the general body of the Bombay Medical Union in one form or another. My Committee are, therefore, glad that the Central Government are moving in the matter in consultation with the Local Governments, and hope that the Drugs Enquiry Committee will be able to recommend a comprehensive policy to Government on the lines suggested hereunder, and that Government will take speedy measures to bring the recommendations of the Committee into early effect. This is necessary as we are already about two generations behind the other countries in taking action in the matter. My Committee do not propose to go into the reasons for such delay on the part of Government in taking recourse to steps which would have put the use of drugs under effective control in this country, but they cannot help but feel that the medical advisers of Government have been negligent in the effective pursuit of this matter.

PART I

2. Before answering the questionnaire, my Committee would like to make a few general observations on the terms of reference to the Drugs Enquiry Committee.

3. It appears from the report of H. M. Senior Trade Commissioner for India and Ceylon for the year 1928-29, that the following drugs and medicines costing about Rs. 2,01,84,000 during the course of that year were imported into India. The principal items included in the trade are as follows:—

Name of drugs.	Cost in lakhs of rupees (in round figures).	Names of countries from which they are principally imported.	
		From United Kingdom.	From other countries.
	Rs.	Rs.	Rs.
Camphor	27,52,000	2,000	27,50,000
Cod liver oil	1,30,000	81,000	49,000
Morphine and preparations of morphia and opium	1,36,000	1,09,000	27,000
Proprietary and Patent medicines ..	42,84,000	23,13,000	19,71,000
Quinine salts	24,47,000	14,95,000	9,52,000
Other sorts of drugs and medicines ..	1,04,35,000	48,99,000	55,36,000
Total ..	2,01,84,000	88,99,000	1,12,85,000

4. It will, therefore, be realized that the major portion of imports, excluding camphor, amounting to Rs. 88,99,000, come from the United Kingdom. In a way, this is unfortunate, because though a Sale of Food and Drugs Act does exist in that country, that Act is not made applicable to exports of drugs, etc., from that country to India and other places, with the result that there is no surety or warranty that all the drugs, etc., imported into India from the United Kingdom have that purity of composition and standard which are insisted upon for drugs used in that country itself under the Sale of Food and Drugs Act. It is well known that certain firms abroad specialize in the export of drugs especially manufactured for the Indian and the other Eastern markets, and, as some of these firms do not always export articles of standard quality, but mainly with a view to selling them at competitive rates, the effect produced on the articles of local manufacture is bound to be deleterious, in that they cannot be always of standard quality, if they have to compete against adulterated articles or articles of cheap quality and packing dumped into the country. It is, therefore, highly essential in the interest of the public as well as of maintaining a high standard of quality in the drugs and medicines manufactured locally, that an effective control should be exercised to prohibit the import of drugs which are below the standard of purity and composition laid down for such drugs in the country of origin. It may be stated that, as against the law in the United Kingdom and other countries, to whom also the above remarks apply more or less, the United States of America have a better type of legislation in this respect. By the pure Food and Drugs Act of 1906 and subsequent amendments, all drugs manufactured in the United States, whether they are for use locally or for export abroad, have to be of the strength and quality prescribed under the Act. My Committee are, therefore, emphatically of opinion that, both in the interest of the public as well as the profession, some such Act is necessary to control the quality and strength of drugs, etc., either imported into or manufactured in this country. My Committee believe that without proper legislation such an evil cannot be controlled. As this country is subdivided into British India and Indian India (i.e., Indian States), it would be necessary for the legislation to provide for the control of drugs and chemicals, whether imported directly through the ports of British India, or indirectly through the ports of the Indian States, as well as of the drugs, etc., manufactured in the country, so that, in practice, the provisions of the Pure Drugs Act may not be evaded. In this connexion, it is necessary to make clear that my Committee are in favour of enacting a pure Drugs Act only for this country, and *not* a combined Food and Drugs Act, as is the case in the United Kingdom and some other countries. This recommendation is made in view of the peculiar conditions of India, and in view of the fact that the assay and analysis of drugs, chemicals and therapeutic substances would require a specialized study. The Pure Drugs Act would need to be an All-India Act, while the Pure Foods Act can be passed by the Provincial Councils. As a matter of fact, the Bombay Prevention of Adulteration Act was enacted in 1925 with a view to preventing the sale of the adulterated foods in the Presidency. In the case of proprietary foods, etc., designed for invalids and infants and utilized medicinally, it would be, however, desirable to bring them under the purview of the Pure Drugs Act.

5. For the effective control of drugs, chemicals, etc., either imported into the country or manufactured locally, it would be necessary to have one central laboratory and three or four smaller laboratories in important centres for the testing of drugs, etc. My Committee are of opinion that in view of the fact that Bombay is the principal centre of import of drugs, etc., the central laboratory should be located in or near Bombay, and the branch laboratories at important centres like Madras, Calcutta, Lahore, etc. The laboratories should be in the charge of experts in chemical analysis as well as in bio-chemical methods of testing drugs. These officers should be recruited for their specific qualifications, and not drafted, in accordance with the hitherto pernicious system of Government, from the Indian Medical Service.

6. With regard to the provisions of a Pure Drugs Act for the country, my Committee are firmly of opinion that no piecemeal legislation will tackle

the problem effectively. A comprehensive Act would be necessary and such an Act should contain provisions for—

(1) guaranteeing the purity and strength of drugs;
(2) the prevention of adulteration;
(3) the inclusion of the so-called therapeutic substances referred to in the Therapeutic Substances Act of the United Kingdom;
(4) the control of proprietary and patent medicines, including proprietary foods designed for invalids and infants, etc., used medicinally, and of proprietary and patent appliances;
(5) the inclusion of such provisions as are found in the Poisons and Pharmacy Acts of the United Kingdom.

A complete control over the importation, manufacture and sale of drugs of every variety could thus be accomplished under a single Act.

Terms of reference

7. With regard to the first term of reference to the Drugs Enquiry Committee, it is difficult for my Committee to say to what exact extent pharmacopœial drugs and chemicals of impure quality or defective strength are imported into the country, but the general opinion of the members of the Union is that quite a good proportion of such drugs and chemicals imported in the country would come under this category. Likewise, it may be said that quite a fair proportion of drugs manufactured in the country is either of impure quality or defective strength. As regards the known and approved medicinal preparations other than those mentioned in the pharmacopœia, my Committee are of opinion that the recommendations previously made in paragraph 6 should apply equally to such preparations. The latter part of the second term of reference seems somewhat ambiguous, and my Committee would therefore desire to state that the recommendations regarding the testing of drugs, etc., should equally apply to medicines manufactured locally from indigenous drugs and chemicals. In case your Committee desire also to convey by indigenous drugs and chemicals the inclusion of Ayurvedic and Unani medicines, my Committee would desire to make the following observations to clear their position.

8. It is well known that several hundreds of herbs grow wild in the forests of India, which are utilized by vaidyas and hakeems in their ministrations. In addition to this, they also use chemicals and animal products. The question naturally arises as to whether there are in existence any tests, standardized or otherwise, by which many of those herbs, etc., can be identified, as is done in the case of the drugs of the British pharmacopœia. In case, no such tests exist for the standardization of all these indigenous drugs, my Committee are of opinion that such an absence of adequate tests should be made no excuse for leaving things as they are, and perpetuating the menace to public health in the shape of adulterated or deteriorated or otherwise dangerous drugs used in the practice of vaidyas and hakeems.

9. As is well known, a very large proportion of the population, particularly in the villages and small towns, resort to these indigenous systems of treatment. Though statistics as to the quantity of the different kinds of drugs manufactured locally are not available, the figures of the import of drugs and medicines given above indicate that drugs, etc., used in the modern line of treatment can be resorted to by a small proportion of the population only. Hence it follows that, if any legislation is undertaken for insuring the purity of drugs, it should not be confined to drugs used by one small section of the population, viz., those resorting to the Allopathic system of treatment only. As to how the drugs, etc., prescribed or manufactured according to the indigenous systems of medicine could be tested, my Committee have no suggestions to offer as they have practically no knowledge of these systems of medicines or of their pharmacopœia. But, it is well known that a number of these herbs and drugs have been tested by various Government Officers and non-officials in India in the past, as shown in the reports of the Indigenous Drugs Committee, and such other committees, and are also being tested at present to some extent in India, and in various Continental laboratories, particularly in Germany and in the United States.

It should, therefore, not be difficult or beyond the resources of modern science to investigate into the composition of these drugs and to standardize tests for their effectiveness. These drugs should also be tested and standardized on the Ayurvedic or Unani methods of standardization wherever possible. A general suggestion may, therefore, be offered, that the proposed Pure Drugs Act should be subdivided into several parts, e.g., part 1 dealing with B.P. preparations: part 2 with Therapeutic Substances; part 3 with indigenous, i.e., Ayurvedic or Unani medicines; part 4 with homœopathic, bio-chemic or any other system of medicine practised in India; part 5 with proprietary and patent medicines and appliances whether Allopathic, Ayurvedic or Unani; part 6 with poisons, and with Pharmacy and with dispensing of medicines of all classes; and part 7 with Dangerous Drugs Act.

10. With regard to part 3 of the Act, referred to above, my Committee are strongly of opinion that an Indian Ayurvedic and Unani Pharmacopœia should be compiled. To that end, a Board or Boards of Ayurvedic and Unani medicines should be created. Such a Board or Boards should be assigned the duty of compiling their respective pharmacopœias, in important Indian languages, on the lines of the British and other Pharmacopœias. Such a Board would also lay down tests for most of the Ayurvedic and Unani medicines in common use among the vaidyas and hakeems. The foundation of an authoritative Indian Pharmacopœia would thus be laid. Such a book can then be made a text-book in Ayurvedic and Unani medical schools, and it would be also an authoritative work of reference. It would be also of help to the Allopathic practitioners. Another Board will need likewise to be created for an Indian Pharmacopœia on the Allopathic system.

11. With regard to the third term of reference, my Committee believe that there can be no two opinions on restricting the profession of pharmacy to qualified persons. In this connexion, my Committee are of opinion that this term should be used in a wide sense, i.e., in addition to dispensers including the training of pharmaceutical chemists and pharmacologists because without such well-trained personnel, it would not be possible to utilize the enormous raw material that exists in India for the manufacture of drugs, and which is at present exported abroad and brought back to India in the form of manufactured drugs at high cost. My Committee believe that the best method of assuring the purity of drugs, etc., is by manufacturing them in this country with the help of trained staff and under adequate supervision. And the lessons learnt in the last War with regard to the disgraceful dependence of India on drugs imported from abroad should not be forgotten. A similar state of helplessness should not be allowed to happen again. This can only be done by developing the pharmaceutical industry in the country. Certain aspects of this question may also need to be referred by Government to the Tariff Board. My Committee are, therefore, of opinion—

(1) that a College of Pharmacy with a Research Department to train and turn out efficient pharmacists should be established in each provincial capital city, or as many of them as possible;

(2) that in addition to the usual syllabus in such colleges, the curriculum should include (*a*) the study of the Biological methods of preparing and of standardizing therapeutic substances, and (*b*) also, if possible, a study of the Ayurvedic and Unani drugs in common use;

(3) that a degree in pharmaceutical chemistry and a diploma in pharmacy should be instituted in the different Universities. In this connexion, my Committee are happy to note that, at the Conference of the Delegates of the Medical Faculties of the Indian Universities, that was convened in May 1930 by the University of Bombay, the conference unanimously resolved in favour of such a course. This resolution reads as under:—

"This Conference recommends that, with a view to encouraging manufacture of drugs and other medical specialities on a scientific basis in India, arrangements should be made by the Indian Universities to start a course in pharmaceutical chemistry, and to institute a special degree and diploma in the same subject."

(4) that as regards pharmaceutical chemistry, the course should be open to those graduates who have taken their degrees in chemistry and botany, the course extending to a period of two years, the examination

being taken either by a thesis or otherwise, the degrees being designated M.Ph.C. (Master of Pharmaceutical Chemistry). It may be stated that there will need to be separate courses of study for analytical as well as synthetic chemistry, with a view to providing for advanced and research work in the country on both these lines;

(5) that the courses of study for the Diploma in Pharmacy (L.Ph.) will be open to those who are matriculates or have passed a corresponding examination, and will extend to a period of two to three years. In future, persons with such degrees or diplomas should alone be eligible to be licensed as 'Pharmacists' or as 'Chemists and Druggists', to which a reference is made lower down.

12. It will thus be seen that my Committee's recommendations include provision for three different types of courses of study, viz.—

(1) Dispensers or compounders.
(2) Pharmacists or "chemists and druggists."
(3) Pharmaceutical chemists (analytical as well as synthetic).

13. By the provision of instruction as is roughly outlined above, many advantages will accrue. In the first place, pharmacy will have attained a high status, instead of being absolutely in the back-waters as it is at present Secondly, a new avenue of work will be made available for a large number of young persons, so that a fair number of our educated unemployed will be provided for with the means of livelihood in an honourable profession. Thirdly, it will assure the possibility of utilizing the existing raw material for manufacturing drugs in the country, and of supervising their manufacture, and thus of supplying the market with purer drugs than will be the case otherwise. Fourthly, research on an extensive scale will thus be possible.

14. Before replying in detail to the questionnaire—Part 2— it would be perhaps desirable to go into greater details, regarding the creation of the class of 'pharmacists or chemists and druggists' referred to above. My Committee are of opinion that directly the training of pharmacists is brought into effect, it would be necessary to maintain a register of duly qualified pharmacists and that such a register should be maintained by a newly formed Pharmaceutical Council or Society endowed with requisite powers and authority like those of the Pharmaceutical Society of the United Kingdom. Subsequent to the creation of the register, the title of pharmacist or chemist and druggist should be reserved for registered persons only an exception being made in the case of firms or corporate bodies who should be allowed the use of the designation, 'Chemists and druggists,' on condition that the shop or dispensary of such corporated bodies is in charge of a duly qualified and registered pharmacist. It would likewise be necessary to issue licences for the practice of pharmacy or the sale or manufacture of drugs and poisons to registered pharmacists only, and to corporate bodies employing such registered pharmacists. The power to issue such licences should be given to a competent authority like the Pharmaceutical Society referred to above, which should also have the *power of cancelling the licence* after due warning, on a proof of sale or manufacture of drugs which are adulterated or sub-standard, and likewise, for the sale of poisons to unauthorized persons, and on proof of failure to observe any provision of the Pure Drugs Act when enacted.

15. My Committee desire to point out that, so far as their information goes, there are not more than six or seven qualified pharmacists or chemists and druggists in a big city like Bombay, and thus, the trade is in the hands of certain traders or merchants, who confess that they know nothing about the drugs and poisons they sell, except the price. The only guarantee they give, is the label marked 'B.P.' by the foreign or local manufacturers. As we have already seen above, the words 'B.P.' are really a misbranding in some cases, indulged in by unscrupulous manufacturers, who stamp even adulterated drugs with the letters 'B.P.' My Committee have no desire to inflict unnecessary hardship on so-called chemists and druggists of to-day, but they would like to recommend that as soon as a College of Pharmacy is established, and trained diplomats or graudates are turned out in sufficient numbers, say within the first seven years, it should be made obligatory for every individual or corporation trading under the designation of pharmacists or chemists and druggists to employ a trained pharmacist in his trade or shop. In this way, a double purpose will be served; our young men will

get employment; and the public and the profession will be protected against the dangers of unqualified persons dispensing any adulterated drugs or medicines without any knowledge or responsibility.

16. From the foregoing, it will be seen that my Committee desire to look at the whole problem of supplying pure drugs to the public from a comprehensive point of view, and would, therefore, urge that no piecemeal legislation would serve the purpose in view. The various recommendations of my Committee are, therefore, interdependent, and unless these are adopted in toto, the enactment of merely a 'Pure Drugs Act' for India will be a failure. The training of pharmacists and the pharmaceutical chemists is thus an essential factor in assuring the supply of pure drugs to the public, and that is why my Committee have gone at such length into the question.

17. My Committee do not propose to enter at length into the question of the cost, etc., of establishing the Colleges of Pharmacy in the country. For this, both Government as well as private philanthropists will have to bear their respective shares. Where there is a will there is a way, and it is hoped that the bogey of financial stringency will not be raised in this regard. A number of local institutions already exist, where, with proper co-operation and organization, instruction on the lines suggested above, could be imparted at a reasonably small cost. In Bombay itself, there are three institutions which could be utilized for the purpose, viz., (1) the Grant Medical College and Sir J. J. Hospital, (2) the Seth Govardhandas Sunderdas Medical College and K.E.M. Hospital, and (3) the National Medical College and Bai Yamunabai Nair Hospital. The last-named institution will have the added advantage, that the Pharmaceutical Works of Messrs. N. Powell & Co., who manufacture various drugs on a large scale, are near at hand, so that the students can have the added benefit of learning the process of manufacture and of testing drugs on a large scale. My Committee would, therefore, urge the establishment of a College of Pharmacy in Bombay without any delay, and without waiting for the enactment of a Pure Drugs Act referred to above.

18. As regards instruction in pharmaceutical chemistry, my Committee are of opinion that such a course could well be started in Bombay at the Royal Institute of Science, the Haffkine Institute, and at the various Medical Colleges. As a matter of fact, the University of Bombay have already moved in the matter of imparting instruction in chemical technology, and it is suggested that provision for instruction in pharmaceutical chemistry should be included in the proposed scheme for Chemical Technology. Hitherto, we have dealt with the terms of reference in general, and have avoided entering into details with one or two exceptions. We wish to point out that what has gone before should be read in conjunction with what follows, in order to form a correct idea of our recommendations, and of the arguments on which they are based.

Part 2

Replies to the questionnaire for the medical profession

19. *Question* 1.—Yes. We have had plenty of occasions to think that our patients are getting drugs and chemicals of defective strength and impure quality.

20. *Question* 2.—It would not be possible to describe personal experience of a large number of the members of our Union regarding the adulteration or inferior quality of medicinal preparations, or to give details. However, we wish to point out that, in the foregoing statement, we have tried to convey as fully as possible our views in the matter of impure drugs of pharmacopœial preparations, and that as to the majority of the proprietary and patent preparations, there are neither tests nor description of the contents given by many manufacturers, with the result that we can give no opinion as to their quality. But we have no doubt that some of these preparations are sold in the market either adulterated or of inferior quality, for lack of legislative control. These remarks apply equally to pharmacopœial and proprietary preprations, either of Indian manufacture or imported.

21. *Question* 3.—With regard to the biological products offered for sale in India, my Committee are of opinion that there is no guarantee of purity, nor against loss of potency, which may be due to the peculiar climatic

conditions in India or the method of storage of these products in this country. In big cities like Bombay, where refrigerators have been installed comparatively recently, and, in the case of the manufacturers of the well-known brands, the loss of potency due to climatic conditions may be more or less guarded against. But the same cannot be said of all firms, nor of the products which are stored and sold in shops up-country, where no refrigerating arrangement is possible.

22. We have sufficient reason to believe that often enough the biological products that are sold in the market are not of the proper strength. In some cases, such preparations have been found in decomposed condition and unfit for use. We would point out here, that, in addition to biological products, the *colloid preparations* are also not found to be of proper strength and that they are also subject to rapid deterioration in the climate of India, and have thus to be guarded against.

23. *Question* 4.—My Committee are definitely of opinion, as has been already indicated above, that legislation is absolutely necessary to control the potency and purity of drugs and chemicals manufactured locally and imported from abroad, for the protection of the public and the needs of the profession.

24. As to the potency, etc., of drugs imported from foreign countries, we have pointed out that, except the U.S.A., many foreign countries, to our knowledge, do not guarantee, either the potency or the purity of drugs, etc., exported from those countries, and further that the words 'B.P.' printed on the label are not always a real guarantee either of potency or purity of the contents of the bottle. In this connexion, my Committee would make the following suggestions:—

(1) That, under the Pure Drugs Act, there should be absolute prohibition of the import of any drugs, chemical or therapeutic agent, whether pharmacopœial or not, whether proprietary or patent or not, which does not bear the certificate or the guarantee of potency or purity, signed by the competent authority of the country of export, with a *declaration* that the particular article certified for export is of the standard potency and purity prescribed in the Pure Foods and Drugs Act or any such Act of the country of origin, and further that the date of manufacture marked on the label is correct. It will thus be seen that, our proposal lays down clearly that *no drug*, which is unsaleable in the country of origin under its own laws, can be exported or dumped into this country. The penalty for misbranding or false declaration should be confiscation by our Customs, Excise or other competent authority, prescribed under the proposed 'Pure Drugs Act,' India; and fine or imprisonment for the importer, on proof of guilt, or revocation of his licence. We would suggest a further precaution, that every bottle or packet should bear on the label before its issue from the customs house:—

(1) the declaration of purity described above,
(2) the date of manufacture in the country of export,
(3) the date of arrival in India,
(4) the probable date of expiry of its full potency or of any particular extent of potency.

25. The above precautions apply to the drugs, etc., imported into the country. Similar precautions would also be necessary in the case of drugs and chemicals manufactured locally. It should also be noted that, in some cases, wholesale merchants order large quantities of drugs, etc., in big containers, from which the medicines are measured out in small quantities and bottled or packed here in India. While doing so, there is a great possibility of adulteration or of short weight. This will be guarded against by the issue of licences to every seller of drugs, who will be a pharmacist as described above, and who will be held personally responsible for the nature, substance and the quality of the articles sold by him. With the training and employment of pharmacists, no plea of ignorance on the part of the untrained traders in drugs would then be permissible.

26. My Committee would further recommend that, under the proposed Indian Pure Drugs Act, competent public analysts will need to be appointed whose duty it will be to assay drugs, chemicals, biological products, etc., purchased by special inspectors, for whose appointment also provision will need to be made under the Pure Drugs Act. The drugs and the biological products, thus purchased from the chemists and druggists' stores or from shops by the inspectors will be subject to analysis by public analysts at any

time. A check will thus be maintained on druggists and chemists, as regards the purity and quality of drugs sold by them in the market. The method of controlling imported drugs can thus be summarized as under:—

(1) The labels on the containers of drugs, etc., must bear the declaration of purity, date of manufacture, etc., from the proper authority of the country of export, as suggested above.

(2) The Customs authorities of the ports of entry must have the power under the Act to exclude or to confiscate such drugs as are adulterated or misbranded or deleterious or which are found on assaying to be sub-standard. For a proper functioning of this work, it will be necessary to organize and equip laboratories on an adequate scale for the chemical and biological testing of drugs, as without such proper assistance, it would be *futile* to pass the 'Act' or to endorse its provisions.

(3) The inspectors under the 'Pure Drugs Act' will take samples from the shops or stores for examination by the public analysts or any other competent authority under the Act.

(4) Licensing of all drug shops and stores, say within seven years of the passing of the said 'Act,' by which time, they could all engage registered pharmacists referred to in paragraph 11 above. Holding the pharmacists responsible for the purity and potency of drugs for sale in the shop, and loss of the licence on default and other penalties under the Act would check adulteration.

(5) Further, it should be open to any aggrieved person, who buys any drugs and has a reasonable suspicion to believe that he has been served with an adulterated or sub-standard drug, to have the right of having the particular sample examined at a nominal fee by the Public Analyst or any other competent authority under the Act. In case, the complaint is found to be justifiable, the fee for such analysis should be refunded.

(6) From what is stated above, it follows that the Pure Drugs Act in India should have reference not only to the purity of drugs imported into the country but also of drugs, etc., which may be exported from India, in the same way as is done in the case of exports of drugs, etc., under the Pure Food and Drugs Act of the United States of America.

(7) It will be also not out of place to mention here that some kind of control would be necessary over the purity of raw material which are utilized in the local manufacture of drugs, etc.

27. In the same way, the recommendations for the control of drugs manufactured locally could be exercised by enforcing clauses 3, 4 and 5 referred to in the preceding paragraph 26, with regard to imported drugs, etc. It would be further necessary to license the manufacturers, and no such licence should be issued unless the firm has on its staff one or more competent chemists or pharmacists holding such degrees or diplomas as are approved of by the proposed Pharmaceutical Society under the Act. The local manufacturers should also be made to indicate on the labels of the containers of the drugs, (1) whether the particular preparation has been standardized, either chemically or biologically, (2) the date of the manufacture, and (3) the probable date of expiry of the potency of the drugs, etc.

28. Finally, my Committee would further recommend, in this connexion, that as the newspapers are knowingly or unknowingly aiding or abetting the fraudulent vendors of worthless or harmful medicines—both imported as well as locally manufactured—some sort of check is necessary on *the advertisement of medicines*. Without such check there will be no real control over the activities of unscrupulous vendors.

29. *Questions* 5 *and* 6.—My Committee are of opinion that the control of therapeutic agents on the lines enacted in such countries as Great Britain, U.S.A., etc., or on the lines laid down by the Health Organization of the League of Nations, is not only equally desirable, but also essential in the interests of the public as well as of the profession. In so far as practical suggestions are required, we have already suggested in the foregoing paragraphs 6 and 9 that instead of having piecemeal legislation, the proposed Pure Drugs Act for India should be comprehensive and include provisions for the control of therapeutic substances. Further, that the provisions of such an Act *cannot be enforced* without a properly equipped central laboratory—paragraphs 5 and 26—and a competent staff, and looking at

the vast area of India, each major province should be self-contained, and maintain its own laboratory for two distinct purposes, viz., (*a*) for the testing of samples of drugs, etc., as a measure of control, and (*b*) to institute training and research in the manufacture, analysis and synthesis of drugs and biological products. It is not necessary to repeat here that no distinction whatever should be made in the control of potency and purity of drugs and chemicals and of therapeutic substances, and further that, whatever recommendations are made by us in reply to question 4 should also apply to question 5.

30. *Question* 7.—We have no knowledge regarding the standardization of various preparations made from drugs used in the indigenous medicines, but my Committee feel that, unless adequate laboratories are started for such work in the case of Ayurvedic and Unani preparations according to their systems or otherwise, no standardization of these drugs can really be possible on any effective scale—paragraphs 9 and 10. Some members of the medical profession and of our Union do use some such preparations but it is not possible to give any details regarding them.

31. *Question* 8.—My Committee are not in a position to give any detailed information in this regard, but it is our impression that such preparations have proved on many occasions either ineffective or harmful. The question of controlling these preparations has been discussed in paragraph 25, etc., above, which may be referred to. My Committee are of opinion that efforts should be made to establish standardized tests for these preparations—paragraphs 9 and 10—and to train, examine, license and register the pharmacists and dispensers for Ayurvedic and Unani drugs so that there should be no difference so far as the control of the purity of drugs is concerned, be they of the allopathic or of indigenous systems.

32. *Question* 9.—The increasing sale of proprietary medicines, particularly those with secret formulæ is a menace to public health. These drugs further cause a drain on the slender resources of most of those using them. In the opinion of my Committee, the sale of proprietary medicines which show no formulæ of their composition, whether imported or manufactured locally, should be absolutely prohibited. A crusade against such drugs was raised in the U.S.A., under the caption of the 'Wicked Fraud of Patent Medicines in America' or 'the Great American Fraud' by S. M. Adams, and much benefit to the public resulted from its scathing exposure. Similarly, was exposed 'The Patent Medicine Fraud in Australia' by B. Grace. In England, an incessant war has been waged against the use of proprietary drugs by the British Medical Association, which has published two books, viz., 'Secret Remedies, what they cost and what they contain,' and 'More Secret Remedies.' The question of the use of such proprietary medicines has also been raised in the House of Commons, and a Select Committee was appointed in 1914 to consider this matter. The "Proprietary Medicines Bill," based on the report of this Committee, was introduced in the House of Lords in 1920, but hitherto it has not been passed into an Act. It would be difficult to say to what extent, the influence of the magnates or profiteers fattening on the sale of the proprietary drugs was responsible for the undue delay in the passage of this Bill into an 'Act.'

33. In many civilized countries, legislative measures have already been passed for the control of the nefarious traffic in such drugs. The same should be done in India, and my Committee are of opinion that it would be absurd in the highest degree to control only the imported or the locally manufactured pharmacopœial drugs, chemicals, etc., and to leave alone the proprietary drugs, of which we have a plethora in India, costing about Rs. 43,00,000 annually, Great Britain contributing to the import into India of proprietary drugs, of the value of Rs. 23,00,000 per annum. Besides the harmfulness or uselessness of some of these drugs, it is well worth remembering that the import of the proprietary drugs is a great financial loss to the country. It has been estimated in the 'Secret Remedies' and 'More Secret Remedies,' referred to above, that the proprietary and patent drugs generally cost the manufacturers one hundredth of their market value, i.e., proprietary drugs of the face value of Rs. 42,84,000 or roughly Rs. 43,00,000, imported into the country, though actually costing only about Rs. 43,000 lead to the drain of almost that amount, i.e., nearly Rs. 42,41,000 from this country, and for which

the country gets almost worthless stuff in return. The same criticism applies likewise to patent medicines manufactured in India. Legislation will be needed to control these drugs, whether imported or manufactured locally.

34. The best way to deal with the traffic in proprietary and patent drugs is to abolish their import or manufacture altogether. No doubt, this course is frought with difficulties but the question needs to be carefully tackled. It would not be out of place to quote here the definition of proprietary medicines or appliances. These mean 'any chemical, drug or similar preparation or appliance used in the treatment of diseases, if such an article is protected against free competition as to name, product, composition or process of manufacture by secrecy, patent, copyright or trade mark or by any other means.' For their effective control, it would be necessary either to pass a separate 'Proprietary Medicines Act,' or preferably to include the necessary provisions as a part of the 'Pure Drugs Act' for India. As in the case of pharmacopœial drugs—paragraph 26—the method of controlling the proprietary medicine and appliances may be summarized as follows:—

(1) The labels on the containers of drugs or appliances should bear the declaration of the competent Health authority of the country of origin, as to the purity and potency of the drugs, etc., which constitute the proprietary remedies or appliances, and certify that the said medicine or appliance is permitted to be sold in the country of origin under the existing laws of the country, and that the same is not harmful or dangerous to the public who buy and use it. The labels should bear the probable date of expiry of the potency, etc., of the drug. If, in any particular case, where the manufacturer states that the article contains some unknown medicine, then he should be compelled to declare on the label or in an attached leaflet, any special test for this drug or any method of its standardization to enable any public analyst to carry out the necessary test for its identification.

(2) The Customs authority of the ports of India, where these proprietary medicines and appliances are unshipped, will have and shall exercise the power under the Act to exclude or confiscate such proprietary articles as are misbranded or bogus, and which are found on assay to be sub-standard or adulterated, etc.

(3) The Inspectors under the Act will take samples from the shops for examination, etc., under the Act.

(4) The sale of proprietary medicines and appliances should, like that of other medicines, etc., be in the hands of registered pharmacists, or corporations employing registered pharmacists holding licences under the Act. The pharmacist, who sells such proprietary articles, would be held responsible for the purity, etc., of the said articles, and be deprived of his licence in case of default.

(5) Finally, any aggrieved person who buys such proprietary medicines, etc., and has reason to believe they are adulterated or sub-standard or bogus, should have the right of having the particular sample examined at a nominal fee by the public analyst or other competent authority under the Act. In case the complaint is found to be justifiable, the fee for such analysis should be refunded.

(6) My Committee are of opinion that the following definition of misbranding, in the case of both pharmacopœial drugs and proprietary medicines or appliances, should be adopted in the proposed Pure Drugs and Proprietary Medicines Act for India. That the term 'misbranding,' as used herein, shall apply to all appliances, drugs or articles of food for invalids (or articles which enter into the composition of such foods), the package or label of which shall bear any statement, design or device regarding such articles, or the ingredients or substances contained therein, which shall be false or misleading in any particular, and to any drug or product which is falsely branded as to the State, territory or country in which and the date on which it is manufactured or produced. That for the purposes of this Act, an article shall also be deemed to be misbranded in the case of drugs—

First.—If it be an imitation of or offered for sale under the name of another article.

Second.—If the contents of the package as originally put up shall have been removed in whole or in part and other contents shall have been placed in such package, or if the package fail to bear a statement, on the label, of the quantity or proportion of any alcohol, morphine, opium, bhang, charas, cocaine, heroin, alpha or beta-eucaine, chloroform, cannabis indica, chloral hydrate or acetanilide, etc., or any derivative or preparation of any such substances contained therein.

Third.—If its package or label shall bear or contain any statement, design or device regarding the curative or therapeutic effect of such article or of any of the ingredients or substances contained therein which is in any manner deceptive, false or misleading.

35. My Committee would like to point out that the laws relating to proprietary medicines, etc., in different countries vary to some extent, and, particularly, in relation to advertisements or ordinary as well as proprietary medicines and appliances. Thus, in some countries advertisement is absolutely prohibited, while in some others it is regulated. It would, no doubt, be an ideal thing to *prohibit* them absolutely particularly in the lay papers. But as the ideal will not be achieved soon enough, we may suggest that the following methods may be applied to control all advertisements whether appearing in lay or medical papers, in leaflet, etc., distributed through the post office or by hand or on posters, on hoardings, etc:—

(1) Both the printer and publisher should be held responsible and punishable for any advertisement which amounts to 'misbranding' as defined under this Act, or which is indecent, or which is dangerous to health or life, as in the case of poisons, abortifacients, etc.

(2) That all advertisements and sales of medicines (*except* the sale by a doctor's orders of medicines) purporting to cure the following diseases be *prohibited*: cancer, consumption, lupus, deafness, diabetes, paralysis, fits (epilepsy) locomotor ataxia, Bright's disease, rupture (without operation or appliance), sexual weakness and impotence, venereal diseases, and so-called female ailments—(a cloak for abortifacients).

(3) That competent inspectors should be appointed under the Act to examine advertisements, and to observe the sale of proprietary medicines, and appliances, and to report defaulters to the special council as per following paragraph.

(4) That a special council or commission be constituted, with power to permit or to prohibit in the public interest or on the ground of non-compliance with law, the sale and advertisement of any patent, secret or proprietary remedy or appliance; or any other registered or trade-marked remedy or appliance and that the commission appointed for the purpose be a judicial authority with two assessors—one an expert in pharmacology and the other a public analyst under the Act. It may be stated that it would be necessary for the council to maintain a register of all articles, (*a*) permitted and (*b*) prohibited entry or sale in this country.

36. *Question* 10.—My Committee are of opinion that inaccurate dispensing is not uncommon. The reason for this lies in the fact that Government have failed in their duty of making any systematic provision for the proper training, examination, certification and registration of compounders or dispensers on the plea of financial stringency. The subject has been under discussion on and off at several meetings of the Bombay Medical Union, and some members of our Union, who are also members of the Bombay Medical Council, took the matter up before that Council but to no purpose. My Committee are strongly of opinion that adequate provision should be made without further delay for the training, examination, certification and registration of compounders in every province.

37. *Question* 11.—My Committee would like to make the following general remarks on the subject-matter under discussion, and would be glad to substantiate, as far as possible, the statements made herein *by deputing* about two or three of their representatives personlly, if so desired:—

(1) A permanent authority for the periodical publication of the pharmacopœias mentioned above—paragraphs 10, etc. It is highly desirable that a permanent authority, such as the Board of Trustees of the United States Pharmacopœial Convention, should be established in India, with

power to prepare a pharmacopœia of India, subdivided into two parts. Part 1, called 'International Pharmacopœia,' dealing with all recognized remedies found in the Pharmacopœias of all civilized countries, and those approved of by the International Pharmaceutical Federation at the Hague, and at the Brussels Conference, and by the Special Board in India (paragraph 10), whilst Part 2 should deal with Indian indigenous medicines, not included in Part 1, and be called 'The Ayurvedic and Unani Pharmacopœia.' It is well known that in addition to the many official pharmacopœias, there are other non-official compilations published in foreign countries, for example, 'The Extra Pharmacopœia of Martindale,' and the 'British Pharmaceutical Codex,' etc., in the United Kingdom; the 'National Formulary,' and the 'New and Non-official Remedies,' published by the Council on Pharmacy and Chemistry of the American Medical Association, in the U.S.A., and so on, in other countries. My Committee would recommend the creation of such a council or commission endowed with legal powers to examine all non-official and proprietary remedies and appliances, whether imported or home-made, and, if found worthless on such examination, to prohibit the manufacture and sale and advertisement of the same. This council may also be empowered to supervise and control the advertisements of all sorts of medicines and appliances—paragraph 35. It appears that about half a dozen new medicines or appliances are invented or patented and thrown on the market almost every day, with high-sounding advertisements. India should not be allowed to be made a dumping ground for such stuff from abroad, nor should such nostrums be allowed to be manufactured in the country.

(2) In the U.S.A., the post office is empowered to confiscate all medicinal articles and advertisements which transgress the law of the land and particularly, the provisions of the Pure Food and Drugs Act. This practice has worked fairly effectively, and some such legislative measure is needed in this country.

(3) The laws of Patents and Designs, of Trade Marks, and of Stamp Duties need a thorough revision, to prevent the frauds, being carried on under the very protection of law itself, as described in the report of the Select Committee of the House of Commons on Patent Medicines.

(4) Registration of and heavy duties on all imported and home-made medicinal articles and appliances, whether patented or trade-marked, would check the growth of this fraudulent industry to some extent. What amendments and altertions should be made to the existing laws of India, relevant to this subject, is essentially the work of lawyers. My Committee are, therefore, not in a position to submit any draft of such amendments, etc. No doubt, legal assistance would be sought by the Drugs Enquiry Committee in this matter.

(5) Reference to the Tariff Board for the growth, development and protection of our infant industries.

With the development of pharmaceutical and allied industries in India, the time has arrived for their protection by law against the keen competition in these industries of other nations, which rely on *mass production* of medicinal articles and appliances, as against the manufacture on a relatively *small scale* possible in this country. My Committee are strongly of opinion that Government should undertake to protect and give every encouragement to the manufacture of drugs in India in preference to the imported articles. In view of the fact that this country abounds in the necessary raw materials, which are at present exported to foreign countries and re-imported as manufactured drugs, my Committee believe that, with such encouragement and protection, it is possible not only to stop the import of a large proportion of manufactured foreign drugs, but actually to export drugs in a manufactured state abroad.

(2)

By Dr. Kaikhosru K. Dadachanji, late Captain, I.M.S., Consulting Surgeon, and Specialist, The Genito Urinary, Skin and Surgical Hospital, Fateh Manzil, New Queen's Road, Bombay

I have to acknowledge with thanks the receipt of your reply, dated the 29th September 1930, enclosing two copies of the questionnaire of your Committee.

I have to thank your Committee for your assurance that all my views outlined in my address will receive their best attention.

My address dealt with the situation of the drug problem in India as it existed at the time of delivery of same, and has more or less continued so till now. However, as your questionnaire and covering letter demand specific answers to the questions, and a discussion of the subject on certain lines, I desire to make the following statement for the consideration of your Committee.

A copy of the questionnaire was sent by you to the Bombay Medical Union, for an expression of their views. It was referred by the Union, of which I have the honour to be the Vice-President, to a special subcommittee which entrusted the work of drafting a preliminary report to me revised with the collaboration of Dr. Jivraj Mehta. Our draft was subsequently adopted by our Managing Committee, and later forwarded to your Committee.

Thus, this report contains my views expressed in my address on the subject, elaborated, together with the added endorsement and approval of my colleagues of the Union. Hence, I have not much more to add for the present to the report—though much more can be said on the subject—as my reply to my questionnaire, which you were kind enough to send to me, with the exception of the following general remarks, which were not incorporated in the said report.

It has been argued in the press by some correspondents that, owing to the financial stringency of Government, the report and recommendations of your Committee will be pigeonholed, and all your labour will prove abortive in the end. In our Union's reply, we have anticipated the possibility and for that purpose, among others, we have suggested the imposition of heavy duties on all imports of medicinal and allied preparations in paragraph 37, sections 4 and 5. One would suggest the following scale of duties. As per paragraph 3 of our report, roughly two crores worth of foreign preparations are imported per annum, a 10 per cent *ad valorem* duty will bring in Rs. 20 lakhs, and a 20 per cent or higher duty Rs. 40 lakhs or more, which would suffice for starting and maintaining assay laboratories and staff and inspectorate for the control of drugs. Even if the imports shrink in value, our national object of preventing the dumping of same and to encourage home industries, would be served. In addition to duties on imports, a 5 per cent or higher duty on all home-made indigenous preparations will bring in some more lakhs.

Further, like all civilized Governments, our Central and Local Governments must make annual grants for the purpose, in spite of so-called financial stringency, as this is a matter of vital importance to our people, and economize in other and less vital directions, if necessary, in case these Governments do not wish to be considered uncivilized.

Can one hope for some such recommendation from your Committee?

So far as the substitution of Indian drugs for the foreign imports is concerned, it may be pointed out that our Union had appointed a Joint Boycott Committee on which there were representatives of the local Chemists and Druggists' Union and, in the report of the said committee, appendices have been inserted containing the lists of such substitutes. On perusal of these appendices, it will be realized that practically almost all the pharmacopœial preparations are at present being manufactured in India by several Indian chemists and druggists, and, if there are a few exceptions, they can be manufactured with due encouragement from the medical profession. So far as the therapeutic substances are concerned, a large number of the same are actually manufactured in India, the exception being mainly Salvarsan and substitutes which also can in future be manufactured if sufficient encouragement were forthcoming. So that, practically where pharmacopœial preparations or therapeutic substances are concerned, India can be self-contained, and the dumping of adulterated rubbish from foreign countries can be effectively prevented by the encouragement of our Indian manufacturers by the medical profession and the Government and the public. For the sake of clarity one may add that there are a few unofficial preparations which being patented cannot be manufactured as such, but substitutes even for these can in future be manufactured in India.

In conclusion, one would suggest that your Committee may be pleased to quash the bogy of the indispensability of imports of foreign drugs and

other preparations for the relief of humanity, in India, on the presumption —amply refuted in our report—that only foreign drugs are or can be pure, and that Indian manufacturers are incapable of manufacturing pure drugs according to international standards and as efficacious as foreign imports! Some correspondence has appeared in papers probably from the propagandists of foreign drugs that the medical profession in India cannot rely on Indian-made drugs, etc.! The Committee would be doing a great service to India by exposing this bogy raised by vested foreign interests, and by assuring the medical profession of India that Indian manufacturers do and can supply drugs of standardized purity and reliability, which they can prescribe in future with confidence, particularly if all the measures, recommended in our report, be adopted.

(3)

By Mr. M. N. Niyogi, M.Sc., Officiating Chemical Examiner for Customs and Salt, Bombay

A

Drug control laboratory in India

Food or drug control rests now in the United Kingdom with the Ministry of Health. The central testing laboratory for food and drugs is the Government laboratory. Under the Sale of Food and Drugs Act, power is given to Courts of Law to refer samples to the Government Chemist in cases of dispute. Public Analysts, appointed by the local authorities throughout the country with the approval of the Ministry of Health, do the necessary testing work in accordance with the Sale of Foods and Drugs Act in vogue. A number of Public Analysts are well-known chemists, having to their credit brilliant records of investigational work.

2. The Government laborotary in London is a Central Government organization which at the present time undertakes work for nearly every Government Department.

3. The Government of India do not have a central laboratory for all Government of India chemical work for civil departments similar to the Government laboratory of London. The Government of India have separate chemical organizations, developed gradually through different periods of existence, and quite distinct from each other in the nature of work done. For example, the Agricultural, the Indian Stores, the Customs, etc., Departments have each got separate laboratories.

4. It is eminently desirable that, to have uniform standards of materials and practice, drug control should be a central subject and there should be a central laboratory for the execution of routine and research work. Undoubtedly there should be provincial organizations which should be gradually developed according to the particular needs of the various areas of particular provinces. These provincial organizations should work in close cooperation with and under the general guidance of the Central organization.

5. The question now is whether the proposed central drug control laboratory should have an independent existence or should it be attached to one of the existing Government of India laboratories. As a matter of so-called convenience and economy, it would appeal to the minds of many that it would be best to tag the drug control laboratory to one of the existing laboratories. But I am definitely of opinion that the advantage of economy (because, on a careful analysis this is the only advantage that can be claimed) to start the drug control work will be more than counterbalanced by the disadvantages of a joint laboratory and the advantages of an independent laboratory, as noted below:—

(i) A subordinate existence will deprive the drug control laboratory of the undivided attention, which is so essential for such an important organization, of the working and supervising men to bring it quickly up to the level of a really efficient and useful organization.

(ii) Apart from routine work, quite a big volume of research work is essential for the successful development of an efficient drug control laboratory. The development of an Indian Pharmacopœia of indigenous drugs will naturally follow as a corollary to the statutory control of drugs in this country. It will, therefore, be in the fitness of things for the central

drug control laboratory to take up research work for this purpose and also to carry out a large volume of research work even for the successful carrying out of routine analysis in connexion with the testing of indigenous drugs. Considering the needs of the work, I doubt if any existing laboratory in the country is sufficiently equipped to carry out this work.

(iii) In the United Kingdom, the public analysts receive a special training in analytical chemistry, microscopy and therapeutics for competency in food and drug testing. Chemical science has grown so much that in the present day it is unthinkable that any specialist laboratory can grow without one or a group of scientists having specialist training and experience or opportunities to gain them, in particular specialized branches.

(iv) In the best interests of the drug control laboratory, its constitution should be such as to enjoy the fullest confidence of the general and the drug manufacturing public. An independent existence is best calculated for the growth of that reputation.

B

Every civilized nation at one time or other has been faced with the question of the control of drugs; and, in the interests of the welfare of the public, to protect them from becoming the dupes of profiteering manufacturers and unscrupulous practitioners and quacks, the Government concerned have been forced to legislate against the manufacture or sale of deficient and deleterious drugs. India to-day is faced with a similar problem and there can be no two views on the need for such protective legislation.

In this country for one or another of the following reasons very little testing of drugs is done:—

(1) Absence of a definite standard, non-conformity to which would be accepted by courts of law as primâ facie evidence of low quality or adulteration.

(2) Absence of governmental (including municipal) machinery to obtain samples of drugs sold and get them tested.

(3) Absence of any legislation preventing any quack or unscrupulous person setting up as a medical man and selling medicines.

(4) Paucity of laboratories which are entitled to take up examination of any samples, if any enterprising individual or body sends such samples.

(5) A more or less general indifference among practitioners and dispensing chemists to make themselves sure that the medicines they employ are of good quality and strength.

(6) The paucity of properly qualified compounders.

(7) Considerable, almost phenomenal, ignorance and credulity on the part of the general public.

There is, of course, a little testing of drugs done under the following heads. Such testing however is far from the needs of the case. The little testing done is—

(1) By local Government laboratories for the Medical Stores Department of the Government. As contracting parties, the Medical Department will surely reject unsatisfactory consignments. But these medicines form only a fraction of the amount that is consumed by the public.

(2) In Custom House laboratories

(*a*) for alcoholic strength, this is only for purposes of revenue. No attempt is made to see if they are of the proper quality.

(*b*) Some B.P. preparations marked B.P. are occasionally tested to know if the marking is correct. These tests are made under the Merchandise Marks Act. When preparations are found to be below strength, a small fine may be imposed on the importer and the consignments are allowed to be cleared after the offending mark B.P. is removed.

Here the trained dispenser may know that the preparation may be deficient; but considerations of cheapness and the consciousness of his immunity against legal action, may induce him to employ it deliberately.

(*c*) Testing for restricted drugs in cases where the chemical department has been specifically asked to report on their absence or presence. This is usually confined only to new preparations, imported and exported, or wherever there is reason to suspect their presence.

(3) Excise Department samples analysed by local Government laboratories for spirit strength.

In determining alcoholic strengths at the Custom House laboratory it has been the experience of the writer that on occasions two samples of the same preparation, made by the same manufacturer, labelled exactly alike and received by the same boat have been found to give widely different alcoholic strengths. There are also instances where the alcoholic strengths are vastly different from the declared values. The existence of such obvious discrepancies raises a presumption, at the lowest, of at least carelessness and negligence on the part of certain manufacturers. Further, while making tests under the Merchandise Marks Act it has been found that many preparations fail by a very wide margin. So much for imported drugs; of locally made medicines, one often hears of bady quality and harmful medicines being sold; but the writer has not made any chemical examination of any of them.

Under the circumstances, no great advocacy is required for effective legislation for the control of the manufacture, import and sale of drugs.

In the case of imported drugs, the Merchandise Marks Act does not suffice for the reason that entry is not refused to preparations which are incorrectly labelled—under the provisions of the Act only the offending label has to be altered.

Instead of amending the Merchandise Marks Act it would be better to pass legislation that would deal both with imports, local manufacturers, local dispensing and cognate subjects.

An Act which may for shortness be called the Indian Drugs Act must be passed by the Central Government. If this were done, instead of leaving each local Government to legislate separately, uniformity at all places will be secured; and difficulties due to possible differences in the provisions that might have been made in the various provinces, if each had been asked to legislate separately, would not arise. Under this Central Government's legislation, each local Government must be given powers to take action, in its turn delegating its powers to district boards and municipalities. Only by delegating the powers thus can the enforcement of the various provisions become effective. If necessary, where municipalities or local boards, etc., do not exist as in villages, the village panchayats or nearest police stations may be empowered to take preliminary action. These, however, are administrative details, on which better authorities will be able to give competent advice.

This Central Act must contain provisions to make the following effective:—

All dispensing houses must be licensed and the compounders therein must all be trained and qualified men. In the absence of a responsible body like the Society of Pharmacists (in United Kingdom) holding qualifying examinations, the Government must hold an examination for pharmaceutical chemists (compounders) testing their knowledge of the requisite amount of chemistry including analytical chemistry. Knowledge of the chief poisons and their effects and practical capacity to dispense, say, from a manuscript prescription. Only people who have passed such a qualifying examination may become compounders. It goes without saying that training institutions for such people should be established. Every private medical practitioner if he employs a compounder may employ only a qualified compounder.

2. A governmental (including municipal, etc., machinery must be brought into existence for obtaining samples of drugs sold and preparations dispensed and getting them tested. For this, a number of authorized drug inspectors (whose business will be to obtain samples) must be employed. A number of laboratories must be started to do the testing of samples brought by drug inspectors; legal action to be taken by the public bodies on the results of the analysis at the laboratories. Perhaps it may be advisable also to empower courts to entertain cases on bona fide complaints made by private parties.

3. Imported preparations are to be tested and allowed entry only if they conform to standards prescribed.

Imported products are at present tested at the Custom House laboratories for alcoholic strength and occasionally under the Merchandise Marks Act. To test them under the new Act in the Custom House laboratories is in a sense only an extension of the testing under the Merchandise Marks Act, and the Custom House laboratories may be asked to make this test. These laboratories with increased equipment and personnel can undertake that work. Some of the Customs Administrative authorities have two very serious difficulties—(1) difficulty of giving increased accommodation to the laboratories and (2) the question of the increased cost of running the laboratories if this additional work is given to them. On these two grounds they view with disfavour the Customs laboratories undertaking the work. As at each of the big ports, however, there is bound to be a local Government or municipal laboratory, the testing may be done there.

The most essential pre-requisite of all this, however, is the existence of a standard for drugs.

For this purpose an Indian Pharmacopœia will have to be compiled, non-conformity to standards prescribed therein being taken as primâ facie evidence of adulteration or poor quality by the trying courts.

My suggestions briefly about the compilation of an Indian Pharmacopœia are these:—

It should consist of two parts. The first part to deal with allopathic and the more common drugs. In the first instance the B.P. may be taken bodily, with appropriate modifications wherever needed, as a working standard.

Part II of the Pharmacopœia is to consist of Ayurvedic and Unani medicines and the less known drugs on which no work has yet been done. It will take a long time for this part to become anything like comprehensive. A considerable amount of investigation will have to be done. As detailed in a short note submitted by me, when I appeared personally before the Committee, I suggest that these necessary investigations may be done in the various medical colleges, university laboratories and other research institutions—the problem being assigned to them by the Central Committee and workers being remunerated on a nominal scholarship basis from a research fund at the disposal of the Committee.

There still exists the question of the control of another class of preparations consisting of proprietary and patent medicines and secret remedies whose compositions are unknown; and also products which are widely advertised to have medicinal and food values. The control of these is not so easy a matter as the control of the simpler drugs. I would suggest, however, a method somewhat on the following line.

There must be a licensing board established consisting of non-interested and eminent clinicians, pharmacists and chemists.

(1) Patent medicines, etc., may be sold only if they have been certified to be free from harmful ingredients, the licensing board also to satisfy itself that the preparations have the virtues that may be claimed for them.

(2) The preparations may only be sold by licensed dispensing chemists and only on the written recommendation of a medical man.

(3) The preparations must specify on the label the disease or diseases for which they are cures and the dosage must also be given.

(4) If at any time in the light of experience the licensing board has evidence to believe that any product has been fraudulently or falsely labelled or that the virtues claimed have not been substantiated in experience the licensing board may withdraw any licence it had granted earlier.

These restrictions are somewhat on the lines adopted in U.S.A.: and only by the adoption of some such methods, can the large sales of harmful or inefficient secret remedies and health restorers, etc., be put a stop to.

Closely allied to this matter is the question of the methods of advertisement that manufacturers of many of these products adopt. If one opens any newspaper one finds countless such preparations cleverly advertized claiming in words or pictorially suggesting the possession of almost elixir-like properties. It is these that catch the eye of the public who are led to believe them and purchase such preparations. In order to make

the sale of such preparations really effective, there ought to be some control on the methods of advertisements also. This is no doubt a very controversial subject; but as, in fact, there is no *raison d'etre* for the existence of such secret preparations, the methods suggested cannot be regarded as any too drastic.

To give a brief résume of the suggestions put forward in some detail in the foregoing pages:—

(1) By an Act of the Central Government control over drugs (imports, local manufacture, etc.) should be established. The various provincial Governments to be empowered to take action under this Act.

Compounders, dispensers, and manufacturers of medicines to be licensed.

(2) A semi-official co-ordinating committee aided by a central laboratory be brought into existence (Appendix A*). The necessary research work to be done at universities, medical colleges and other research institutions, the workers being chosen and remunerated on a scholarship scheme.

(3) In the provinces also a semi-official committee be brought into existence aided by a Government laboratory (Appendix B†) as in case of central one.

(4) An Indian Pharmacopœia consisting of two parts—I—Allopathic and II—dealing with Ayurvedic and Unani, etc., medicines be compiled.

(5) In the actual operation of the Act, the routine tests of samples to be done at provincial laboratories established at suitable provincial towns. Afterwards similar testing laboratories may be started at divisional or district headquarters.

(6) In the case of imports, if there are insuperable difficulties in the way of their being tested at Custom House laboratories, local Government laboratories may do the testing.

(7) In the case of patent, proprietary and secret remedies, control of sale, etc., to be brought about by the same committee as in (3) to act as a licensing body.

A control over the advertising of such remedies also will be necessary.

Appendix A

A detailed scheme of a Central Drug Control Organization

1. A Governing Body or a Council consisting of—

(*a*) Representatives of the medical profession in India of Allopathic, Ayurvedic and Unani systems;

(*b*) Representatives of the Indian Chemical Society and the Institution of Chemists of India;

(*c*) Official nominees.

2. A laboratory to be located in Calcutta as this is a central place for quick communication with various learned societies and laboratories with which a close co-operation is essential.

(*a*) One Chief of tests, may be designated Director (who should principally be a chemist having wide experience in Analytical Chemistry and Microscopy and, if possible, of Therapeutics as applicable to drug testing).

Pay about Rs. 1,500—75—1,800.

(*b*) Two Deputy Chiefs of tests—one an experienced chemist, the other an experienced pharmacologist.

Pay about Rs. 1,000—50—1,250.

(*c*) Three assistants, one experienced in Microscopy and the other in Therapeutics and the third in Analytical Chemistry.

Pay Rs. 150—15—300—20—500.

(*d*) One Head Clerk.

(*e*) Three or two clerks.

(*f*) Six laboratory attenders.

(*g*) Four peons.

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* See Appendix A below.

† See Appendix B at page 242 infra.

Pay for the above—usual scale as in Government of India offices.

Function of the laboratory—

(*a*) Gradual development of an official Indian Pharmacopœia.

(*b*) Investigation on the method of testing of special medicinal preparations which may come under the Drug Control Act.

(*c*) Keeping in touch with investigational work of provincial laboratories and advising them from time to time as necessity arises.

(*d*) To apply some sort of confirmatory test, wherever the Committee desires such a thing to be needed, on investigations and reports submitted from the various laboratories.

(*e*) In the light of reports submitted from various laboratories and experience of private workers to lay down tentative standards of drugs and methods of analysis, these to become official only when the Central Committee after a full discussion has approved of them.

(*f*) To engage in any independent investigational work, just as other laboratories might do. This may be done only in case they have enough opportunity.

APPENDIX B

Provincial Drug Control Organization

1. A Governing Body or a Council representing various interests as noted in Appendix A or as may be found necessary.

2. A laboratory to be located in the most suitable place as determined by each Province.

(*a*) One Chief of Tests (who should have a thorough and wide experience of Analytical Chemistry).

Pay Rs. 1,000—50—1,250; or as the province may decide.

(*b*) One chemist and one pharmacologist. Pay Rs. 750—50—1,000 or as the Province may decide.

(*c*) Three assistants, one each experienced in Analytical Chemistry, Microscopy or Therapeutics.

Pay Rs. 150—15—300—20—500 each.

(*d*) One Head Clerk.

(*e*) Two clerks.

(*f*) Six laboratory attenders.

(*g*) Four peons.

Pay—usual scale of the Province.

Function of the laboratory.—Testing of the common drugs used in the Province together with routine analysis of samples obtained from the local chemists, druggists, kabirajes, hakeems, etc., so as to have an effective control of the indigenous B.P. preparations regarding potency of drugs, control of imported B.P. preparations; control of spurious or deleterious patent medicines—this function to gradually develop with growing experience of the laboratory.

Researches in the testing of the more important indigenous drugs and the more important medicines formulated in the Province.

(4)

By B. D. Amin, Managing Director, The Alembic Chemical Works Company, Limited, Baroda

The Alembic Chemical Works Company, Limited, Baroda and Bombay, which I represent has been specially started with a view to manufacture the drugs and chemicals of the best qualities for the use of the Indian public. We have reached our present standard of efficiency at the cost of much money and great labour. And we naturally expect the public and the Government to help us in our endeavour to put the best stuff on the market. The Government should give all the necessary facilities to encourage honest indigenous manufacturers by preventing the sale of inferior and ineffective drugs in the market, and the public should see that for their own benefit they make use of the best and most effective articles that can be had in the market. As a matter of fact, we have to struggle very hard to keep up our position in the present unfair and unscrupulous competition we meet in the market.

This competition is from two sources:—

(1) The chemists and druggists who deal in drugs and chemicals of impure quality or defective strength. These are generally imported from foreign countries.

(2) Some of the manufacturers in the country itself who to meet the competition turn out very inferior qualities of B.P. preparations. These manufacturers have no properly equipped laboratories; and their turning out inferior qualities of drugs and chemicals is sure to have a pernicious effect on the fate of the pharmaceutical industry of the country which is still in the stage of infancy. Besides, such unscrupulous manufacturers also spoil the good name of those honest manufacturers who produce superior qualities of B.P. preparations. They may thus enrich themselves by defrauding and harming the public; but such a policy ultimately brings ruin to the industry as a whole.

The only remedy is the immediate introduction of a Drugs Act.

In every civilized country the sale of drugs is controlled by law, but here in India, there being no such restriction, the dealers in the drug line are able to stock any quality they like.

That India is one of the chief markets and perhaps the cheapest market in the world is generally admitted and for this reason the introduction of a Drugs Act in this country would be desirable even from the point of view of the dealers as the English or Continental firms make a practice of wilfully adulterating their goods for shipment to India.

To secure a share of the very large Indian trade, some of the foreign houses try to reduce the cost by resorting to short weight, misdescription and adulteration.

The small dealer here has no reputation to loose and is a past master in the art of subterfuges and deceit and is a total stranger to such a thing as commercial morality.

The public safety in India is dependent upon the qualities of articles that are stocked for sale by the various dealers. Unfortunately, the drug business is gradually going into the hands of a class of people, the majority of whom is absolutely ignorant of the essentials of pharmacopœia. Such dealers actually stock inferior qualities of drugs and chemicals and in some cases palm off the commercial qualities as standard qualities to the ignorant customers. There are number of drugs which are not of the B.P. standard and many of them are labelled as crude and commercial. They are being sold in the market and are therefore available for inspection.

A large number of the medical preparations that are manufactured in this country are also of inferior quality. As soon as the Government granted concession in duty on rectified spirit that is used in the manufacture of spirituous medicinal preparations, several bonded laboratories were opened in India for manufacturing tinctures, extracts, liquid extracts of Ayurvedic drugs, spirits, vinums, etc. Unfortunately to compete with one another some of the manufacturers of pharmaceutical preparations are not manufacturing them according to the standards prescribed in the British Pharmacopœia although they label their products as B.P.

They are deficient not only in alcoholic strength which is considerably below the standard recommended by B.P. but they do not even contain the proper quality of active principles of the crude drugs. This is being done with a view to reduce the manufacturing cost and to increase the sales.

Such preparations are used by the medical profession for curing the suffering humanity. Now, what earthly benefit can be derived by the poor patients if these preparations are not of the required standard? The druggists should be held fully responsible for the quality of the drugs stocked by them for sale to the public, so also the prescribing doctor for the quality handled by him in his dispensary. The latter either ignores the vital question of quality by deliberately insisting upon the [illegible] to supply the cheapest stuff, thus encouraging him to stock lower quality or he is too busy to examine every drug supplied by his druggist.

This is a very serious state of affairs and in my opinion it is high time the Government should now stop the adulteration of drugs and selling of a quality other than that prescribed by the pharmacopœias for human

consumption. When Government is so very particular about other industries such as textiles, iron, etc., why should it be indifferent to this important pharmaceutical industry? In fact, Government action has been long overdue as the drugs imported, manufactured and sold are being adulterated and administered to millions of people all over the country. I therefore request that the Government will be pleased to enact as early as possible measures suitable to this country on the basis of similar legislation now in force in other civilized countries.

The other difficulties experienced by my concern is with regard to Excise Rules and Regulations put in force by different Provincial Governments which interfere with the trade in spirituous medicinal preparations owing to interprovincial trade barriers. The spirituous medicinal preparations are not allowed to move as freely as similar imported preparations. A general policy will therefore have to be laid down in consultation with the Provincial Governments with a view to encourage indigenous industries and to do away with interprovincial barriers.

I shall now reply to the questionnaire point by point *et seriatim*:—

(*a*) Tincture and other spirituous preparations ...	Nil.
(*b*) Liquid extracts	200,000 lb.
(*c*) Solid extracts	20,000 ,,
(*d*) Mineral acids	,,
(*e*) Inorganic chemicals	,,
(*f*) Organic chemicals	,,
(*g*) Alkaloids	,,
(*h*) Organic antimony and arsenic compounds ...	,,
(*i*) Vaccines and sera	,,
(*j*) Organic therapeutic products	,,
(*k*) Proprietary liquid preparations	50,000 lb.
(*l*) Proprietary solid preparations	2,500 ,,
(*m*) Oleums, syrups and oxymels	15,000 ,,
(*n*) Confectio, emplastrum, glycerinum, pilula, pulveres and unguentums	5,000 ,,
(*o*) Perfumery	5,000 ,,
(*p*) Phenyl	2,500 gallons
(*q*) Rectified spirit 96 per cent	100,000 ,,

2. (*a*) From the Indian markets always the same kind of raw materials are not obtained for all times. Their qualities are changing and hence the colour of the finished product also changes.

(*b*) It is necessary to give an idea of our factory which is in the Baroda territory and the British bonded warehouse, which adjoins it but lies within railway limits which is ceded territory for railway purposes. We thus import our goods from the factory into the British bonded warehouse and thence despatch the goods to various places in British India and Indian States. In despatching goods we meet with the following difficulties:—

(1) We have to get the permits from the Broach Collector who lives at a distance of 44 miles from Baroda. It would be more convenient to get these permits from the Assistant Resident at Baroda or from the Excise Inspector of the Warehouse.

(2) In despatching duty-free medicines to the medical institutions in recognized Indian States, the countersignature of the Political Agent, in addition to the signature of the chief medical authority of the State, is now compulsory. It is submitted that the restriction of countersignature may be removed as the responsible medical authority may be relied upon to certify the indents.

(3) In the case of the hospitals and dispensaries in the Bombay Presidency, the countersignature of the Civil Surgeon of the district is made obligatory, whether the institutions are under Government supervision or not. In the Bengal Presidency, the countersignature is required in the case of public or private hospitals, etc., under Government supervision while in the case of private institutions not under the Government supervision but the management of which is in the opinion of the Surgeon-General satisfactory, the supply of duty-free medical preparations is allowed upon an indent signed by the principal qualified medical officer in charge of such institutions. Such a procedure will do away with the difficulties we meet with in this presidency when the Civil Surgeon of

any district wants to be satisfied whether the medicines are of the B.P. standard or not. But he has no means to ascertain the same and so much time is wasted in satisfying him and getting his signature to the indent. His signature is wanted to see that the indent is within the financial limit and that the particular institution is entitled to the concession. He will have to rely on the tests made by the Central Laboratory to be started in each province as suggested by me in another place. And in the case of hospitals not under Government supervision the principal qualified officer's signature should be quite sufficient for the purposes of the indent. To avoid confusion, the Government may, once in a year, issue a list of hospitals, dispensaries, etc., whether under their supervision or not, to which a supply of medicines free of duty may be made. When such a list is once published no countersignature to indents of such institutions will be needed. In fact, what is wanted is a uniform procedure throughout the whole of India so that any part of India may supply duty-free articles to any other part of India under uniform rules adopted unanimously by a conference of representatives from all Provincial Governments.

(4) Another restriction placed is that the prices of a private manufacturer must be lower than those of the Government Medical Stores. But it is difficult to follow this rule in practice for the following reasons:—

(*a*) The priced vocabulary of the Government Medical Stores is not supplied to private persons.

(*b*) The prices do not include (1) charges for bottles, phials and miscellaneous containers; (2) for packing cases; (3) office charges of the Medical Stores; (4) 10 per cent profit; (5) haulage and (6) railway freight. Thus it is not possible to compare the Medical Stores prices with the prices of private manufacturers. Besides, the opium and other narcotic drugs used in Government Medical Stores have not to pay excise duty. Whereas the private manufacturer has to pay duty on such articles. Hence it would not be fair to compare the prices in the case of such articles in which such drugs are used.

(*c*) A responsible medical authority knows where to get cheap and good supply and hence orders his medicines. Why should he be restricted to the Government Medical Stores?

(*d*) The general policy of Government is not to start industries in competition with private enterprise. The Government Medical Store is primarily intended for the army requirements. It should not compete with the public; and, if it does, it should supply its prices so as to include the extra costs, and supply them to the public so that the public may know where they can get cheap and reliable articles. Government should not therefore adopt a policy as will hamper the free growth of indigenous industries.

For the above reasons, the condition that the rates should be lower than those at the Government Medical Stores being rather misleading and hard of calculation should be withdrawn altogether.

(5) We have got to pay the salary and establishment charges of the staff of the Excise Inspector attached to our Bonded warehouse. Inasmuch as we pay nearly two lakhs of rupees in excise duties to Government it is but reasonable that the Government should not saddle us with this extra burden.

(6) It takes inordinately long time to clear from the custom house the drugs coming under the Intoxicating Act like coca leaves and opium preparations. It is requested that the clearance should be expedited as soon as possible.

(7) I must also refer to a serious disadvantage we suffer in comparison with the importer of foreign drugs. It is in this way. We have to pay customs duty on all raw materials as well as packing materials such as bottles, cork, capsules, etc., used in preparing and packing our goods; whereas the importer of foreign drugs has to pay customs duty on the spirit contents only and not on the invoice value. Thus the importer has not to pay customs duty on the other ingredients (raw materials used) and on the packing materials. The indigenous industry has to pay more in the form of customs duty than what the importer has to pay. Thus all the raw materials and packing materials imported for the pharmaceutical industry should be exempted from the customs duty in order to put us on the same level as the importer.

(*e*) No difficulty for the present.

3. Baroda State biological and clinical laboratory attached to the State General Hospital.

4. Some raw materials are obtained from some of the centres in Bombay, Madras and Calcutta Presidencies and Kashmir State forests. Those which are not produced in India are obtained from the countries of their origin, i.e., America or the Continent or Great Britain.

We have got a well-equipped analytical laboratory where the raw materials as well as finished products are analysed by experienced chemists.

5. Mr. I. S. Amin, B.A., B.SC., who was trained for two years in the Pharmaceutical and Technical Chemistry at the Technical College at Darmstadt in Germany.

Mr. C. H. Amin, B.SC.

Mr. C. B. Shah, B.SC., now in America for the study of Organotherapy and Pharmacy.

Mr. V. D. Patel, B.SC.

Mr. D. S. Patel, B.SC.

Mr. P. L. Gandhi, B.SC.

Mr. M. B. Amin, now in Germany taking training in higher pharmaceutical chemistry.

Mr. Soni, B.SC.

6. 190 employees in the factory.
100 employees in the laboratories.

7. We think that there should be a central laboratory to analyse the samples of raw materials and finished products because this laboratory should help those manufacturers who could not keep an up-to-date laboratory and, secondly, that it should be the business of the laboratory to fetch samples from any chemist and druggist and analyse, report and to get those manufacturers punished whose preparations are not according to B.P. standard. In fact, each Provincial Government should have a central bacteriological and clinical laboratory for testing the B.P. standards and for examination of raw materials and finished products, and the certificates issued by a Provincial central laboratory should be accepted throughout the whole of India. This will do away with the present practice in the Bombay Presidency authorizing the Civil Surgeons to determine the B.P. standard when duty-free indents are sent to them for countersignature. As a matter of fact, in the absence of the necessary apparatus and test laboratory, the Civil Surgeons cannot satisfy themselves about the B.P. standard and they should not be asked to undertake such testing. When duty-free indents are sent to them for countersignature all that they have to see is that the Institution comes under the class to which the concession is given. They should not be also made to satisfy themselves whether the prices are lower than those charged by a Government Medical Store for the reasons given by me under a separate head (*vide* paragraph 3 above). To avoid difficulties in this connexion, the procedure for duty-free supply to charitable institutions should be the same throughout India.

III (2).—Though we are not dispensing chemists, the question raised under the head III (*a*) and IV (1), to a certain extent, affects us and therefore I wish to reply to it.

The profession of pharmacy should be restricted to duly qualified persons. With a view to train persons in this line Government should start a pharmaceutical school where instruction should be imparted to three classes of persons:—

(1) Graduates of universities who want to be trained as manufacturing chemists.

(2) Under-graduates (who have passed the Inter-Arts or Inter-science course) who want to work as compounders with big dispensing chemists.

(3) Matriculates who want to work as compounders with medical practitioners or with ordinary firms of dispensing chemists.

The course should include knowledge of the preparation of Ayurvedic and Unani medicines.

IV. General.—(1) There should be a control of therapeutic agents on the lines adopted in Great Britain and the Continent but it should be made suitable to Indian conditions so that the control be extended to Ayurvedic and Unani systems also.

(4) There should be an Indian Pharmacopœia and the medicines should be manufactured as laid down therein. In the case of alcoholic preparations, there should be methods adopted to determine the alcohol strength, solid extractive matter and, in the case of alkaloids, its percentage or, when necessary, a physiological test should be carried out.

(5) The proprietary medicines should have their formulæ disclosed before a medical board. We do not recommend that medicines with secret formulæ be encouraged.

(6) We have found many B.P. preparations imported from foreign countries with a very low alcohol percentage which should not be the case as, in India, the temperature being high, certain medicines would be deteriorated by storage, if low in alcoholic strength.

(7) Many preparations of certain manufacturers and packers in Germany and Great Britain imported into India are found to contain less alcohol. This is done to reduce the cost by saving the larger payment of high custom duty and thus to compete with other preparations in the market in the matter of selling prices.

(5)

By Prof. P. S. MacMahon, M.Sc., B.Sc., F.I.C., Public Analyst to Government, The United Provinces, Lucknow

The United Provinces Prevention of Adulteration Act, 1912, came into operation in 1914 and has since been applied with partial success to the prevention of adulteration of foodstuffs, in particular, milk, ghee and edible oils. An amended Act was passed by the local legislature and brought into effect on January the 1st of this year. The latter is intended to cover over loopholes in the original Act regulating the preparation and sale of foods and drugs and to bring it into line with modern requirements. It also provides for the infliction of punishment of a deterrent kind upon offenders convicted under the Act. The partial ineffectiveness of the original Act was largely due to the absence of adequate penalties for habitual offenders.

So far as drugs are concerned, the Act has been a dead letter. I trace this failure directly to two causes:—

(1) the absence of legislative authority enabling the Government to prescribe the *manner* of the sale of drugs and pharmaceutical preparations, and

(2) the absence of authoritative standards for such preparations.

The first difficulty has been removed in the United Provinces by the amended Act by giving powers to Government to lay down regulations for the sale of any particular foodstuff or drug and all matters appertaining thereto.

Standards.—The second difficulty, that of standards, appears to be the crux of the whole problem. The dispensation of drugs in India is in a chaotic state so far as standards are concerned.

To take a single instance, that of quinine tabloids, a large number of samples of which have been examined here.

Quinine tabloids are issued from four centres in India, namely, the jails at Aligarh, Alipore, Mungpoo and Lahore. Their composition is widely different as issued at each place, and they contain enormous amounts of filling materials, from as much as 53 per cent at Alipore to 19 per cent at Aligarh. I have found some of these pills to contain appreciable quantities of siliceous matter and to be so made up with inorganic ingredients as to be indigestible when swallowed, ineffective in their physiological action, and possibly dangerous to health. If the jail-made products are thus fabricated, it is not surprising to find 'quinine' pills sold with impunity on the market composed of clay and chalk, and containing less than half per cent of quinine.

The question of standardization is however fraught with great difficulties. The report of the Indian Industrial Commission presided over by Sir Thomas Holland in 1918 went so far as to say that it is doubtful if legislation is likely to prove very effective in the direction of preventing the adulteration of drugs (Indian Industrial Commission Report, 1916—18, page 168).

This opinion is probably derived from the well-known difficulty of setting up standards for drugs, and giving those standards legislative effect. No standard, however set up, can be given statutory authority. The only body in the British Empire which has ever attempted to standardize drugs is the British Medical Council in causing to be published under their direction "A book containing a list of medicines and compounds and the manner of preparing them, together with the true weights and measures by which they are to be prepared and mixed, and containing such other matter and things relating thereto as the General Council shall think fit, to be called the British Pharmacopœia."

But the British Pharmacopœia has no statutory authority to insist upon its standards. The British Parliament has systematically refused to legislate upon standards of drugs, and has never delegated its power to any other body to do so. In fact, the mere 'standardizing' of natural drugs, which in most cases would mean dilution to a definite strength, is opposed to section 4 of the English Sale of Food and Drugs Act, 1875, which runs as follows:—

"No person shall, except for the purpose of compounding as hereinafter described mix, colour, stain, or powder, or order or permit any other person to mix, colour, stain, or powder, any drug with any ingredient or material so as to affect injuriously the quality or potency of such drug, with intent that the same may be sold in that state, and no person shall sell any such drug as mixed, coloured, stained or powdered, under the same penalty, etc."

To give the British Medical Council or any other authority, power to standardize drugs would be equivalent to giving them power to override a section of an Act of Parliament.

Even greater difficulties may be apprehended in India, if anybody were set up to standardize drugs. The recommendations could not be accepted in law.

The value of standardizing drugs lies in creating a guide for information of the pharmacist and also for the general public an indication of what they should expect in purchasing them. Standards are essential as a basis for the reports of public analysts.

The whole spirit of the Food and Drugs Adulteration Act resides in section 4 (1) of the original Act wherein it says that "whoever sells to the prejudice of the purchaser any article of food or any drug which is not of the nature, substance or quality of the article or drug demanded by such purchaser, or sells or offers or exposes for sale or manufactures for sale any article of food or any drug which is not of the nature, substance or quality which it purports to be, shall be punished, etc."

To avoid the legal difficulties involved, I therefore suggest, in conjunction with the setting up of standards, that all drugs, proprietary remedies and patent medicines should be labelled, either stating that they are up to the standard prescribed by the British Pharmacopœia or an authoritative body in this country, or, if not up to the same standard, stating the percentage of ingredients of the composition. In this connexion, I recommend the adoption of a regulation like Regulation 8, sections 7 (*a*) and (*b*) of the United States Rules and Regulations for the enforcement of the Federal Food and Drugs Act of 1906 which runs as follows:—

"(*a*) A drug sold under or by a name or a synonym, recognized in the United States Pharmacopœia or National Formulary, unless labelled as prescribed by paragraph (*b*) of this regulation, shall conform to the standard of strength, quality, or purity for the article as determined by the test laid down in the United States Pharmacopœia or National Formulary official at the time of investigation. An article shall not be deemed to conform to such standard of strength, quality or purity unless it conforms in every respect to all the requirements and specifications of the United States Pharmacopœia or the National Formulary for the article.

"(*b*) A drug sold under or by a name, or a synonym, recognized in the United States Pharmacopœia or the National Formulary which does not conform to the standard of strength, quality or purity for the article as determined by the test laid down therein shall be labelled with a statement to the effect that the drug is not a United States Pharmacopœia or National Formulary article; in addition it shall be labelled with a statement showing its own actual strength, quality, or purity, or else with a clear and exact

statement of the nature and extent of the deviation from the standard of strength, quality or purity set out for such article in the United States Pharmacopœia or National Formulary."

As a solution of the problem I suggest that compulsory labelling should apply to all drugs and medicines from whatever source they may come and whatever their nature may be, whether put drugs, compounded drugs, proprietary or patent medicines, foreign or Indian. As regards working standards, I think that for the present British Pharmacopœia might be adopted in this country. Nearly all Indian drugs are mentioned in this book and it would be quite a simple matter to insist upon standards of such medicinal preparations as are mentioned in it being adopted in this country, and being labelled as conforming to the British Pharmacopœia standard. I do not think it would be necessary for the present to set up an Indian Pharmacopœia when most of the material is already contained in the British Pharmacopœia.

Indigenous drugs.—Indigenous preparations, the methods of preparation and composition of which are not completely known, cannot be standardized or brought under control until they have been properly investigated by analysts. It would be necessary for this purpose to set up a central pharmacological institute. It would be quite useless to legislate for these preparations until and unless they are properly described and recognizable with due reference to the various vernacular names under which they appear in different localities.

In India, there is nothing corresponding to the British Medical Council or the Society of Public Analysts. It is therefore necessary to set up an authoritative central body, which, after due consideration of the results of investigations carried out at the Central Institute, could lay down not only analytical standards for finished preparations, but also, in cases the latter are not readily susceptible of analysis by reason of the addition of a large number of ingredients, standardized methods of preparation.

The functions of the Central Institute should be confined to researches in Chemical Pharmacology, to the investigation of natural drugs and medicinal plant-products, and to the laying down of standards and standardized methods of preparation.

Testing of drugs.—As the various provinces already have their own Food and Drugs Acts, the actual testing of drugs, etc., sold in the market should be left to the Provincial Public Analysts, who would be guided by the standards laid down by the Central Council. I do not think it would be desirable or practicable to dissociate drugs from foodstuffs for purposes of legislation, as it is very often impossible to state under which category a product or mixture of substances may fall. For this purpose it would be necessary to strengthen the existing staff of the public analysts or chemical examiners to enable the drug-testing to be carried out with efficiency. In these Provinces it would be necessary to have a staff of one Public Analyst, one Deputy Public Analyst, two Assistant Public Analysts and four Analytical Assistants to carry on the combined work of analysing foodstuffs and testing drugs and medicinal preparations. The present staff is one Public Analyst (half-time), one Deputy Public Analyst, one Assistant Public Analyst and three Analytical Assistants.

Summary.—(1) An All-India Council and Central Research Institute should be set up to deal with all matters relating to the investigation of drugs, for the working out of analytical standards and for standardizing methods of preparation of those drugs, etc., not included in the British Pharmacopœia.

(2) The British Pharmacopœia may be accepted as a guide for the evaluation of imported drugs and for those which do not come under the heading of indigenous drugs.

(3) Indigenous drugs, as their composition and methods of preparation become known, should be brought under uniform control with other drugs and medicinal preparations.

(4) Regulations requiring the proper labelling of drugs and other preparations with their percentage ingredients should be brought into effect.

(5) Testing of drugs under the local Acts should be left to provincial public analysts.

(6)

By Dr. Hari Singh Bisht, Lecturer, Medical School, Agra

The present state of indiscriminate use of medicinal drugs.

For the last few years I have been noticing that patients very often complain that they do not get the same taste and colour in the medicines on repetition or when the prescription is sent for dispensing from one chemist's shop to another, which they get when the prescription is first dispensed. I think there are many reasons for this.

(1) The quality of the medicines, as Burgoynes products, specially tinctures, are far more superior to any other tinctures, but expensive. So, as a rule, chemists avoid using these and use other makers' cheap stuff which is less efficacious, the reason being no uniformity of composition and strength.

(2) In Agra there are number of chemists in the place where, if an illiterate patient or servant goes to get the prescriptions dispensed, he finds different rates per dose in different shops. This state is something like auction of the prescription. Petty chemists impress on them that renowned chemists have more expenses to meet, that is why their rates are very high. So in the pretence of cheapness they either push very old stock of unreliable medicines or sometimes substitute ingredients as cardamom seeds and pink colour for Tinct. Card. Co., olive oil for glycerine and so on.

(3) There are only few so-called qualified compounders even with the renowned chemist, where the object of the proprietor is not false economy to preserve his name and fame; but he gets bad reputation on account of his compounder, who either does not know compounding or is a careless man without knowledge.

This state of affairs is far from satisfactory from medical man's, manufacturer's and patient's point of view who suffers the most and the results are very discouraging.

Compounders

The present day unqualified compounder is a dangerous agent employed in Government Hospitals, charitable dispensaries and chemists' shops. In my opinion the first step to improve the general condition of unsatisfactory affairs of things regarding drugs is the proper training of capable men as compounders. The preliminary qualification for admission to the compounders' class should be at least 8th standard passed or certificate of higher qualification from a recognized school. I would advise competitive examination of qualified candidates for admission.

There should be two compounders' training schools in each Province located in some big central places attached to district hospitals with special staff of two lecturers. The present nine months' training is practically nothing. I suggest that their course should be extended to two years—out of which six months should be devoted to surgical training as a dresser and assistant with lectures on first-aid treatments. Six months' nursing training including patent medicines and invalid's food. One complete year for the study of materia medica and pharmacy including Indian bazaar medicines.

Medicines

To control the potency and purity of drugs, chemicals and pharmaceutical preparations, there should be some legislation to check the growth of unrecognized pharmaceutical work, manufacturing cheap and unreliable preparations garbed under big sounding scientific or pharmacopial names.

(1) A body of expert chemists and scientists with a Central Laboratory under Government of India should be established.

(*a*) They should examine and report to Government, the samples of Indian and foreign-made medicines about the purity, uniformity of composition and strength.

(*b*) This body should also send monthly six expert chemical inspectors to each Province to give surprise visits and inspect the chemists' shops and other places where prescriptions are dispensed. They should give their reports to the Provincial Medical Council, District Magistrate and Civil Surgeon of the district. Finally, this report should be published for the guidance of medical practitioners as well as for general information. Necessary action should also be taken on these experts' reports by the Medical Council.

(2) In districts, the Civil Surgeons, and in mufassal places, the Medical Officer in charge of the dispensary, should give surprise visits to dispensing chemists's shops, at least four times in a year and give his reports to the Medical Council for information and necessary action.

Indian bazaar medicines

Now, it is important to consider that *bazaar* medicines should also form part of allopathic treatment, to achieve this end the following points should be considered:—

(1) Including of bazaar medicines in the course of Medical Schools and Colleges.

(2) Their use in Government Hospital out-patient departments along with British Pharmacopial preparations for the treatment of patients.

(3) To establish one central store of *bazaar* medicines in each Province for the supply of these to hospitals and dispensaries, as, at present, good quality and fresh stock is not easily procurable.

(4) There should be a good book on *bazaar* medicines available for the use of students, practitioners, hospitals and chemists.

Chemists

(1) Provincial Medical Councils should have full control over all the chemists in the Province. They should issue licences and keep a register of all the chemists and general merchants dealing on British Pharmacopial preparations, patent medicines and medicated foods. This list should be published yearly.

(2) Licensed firms should not be allowed to compound or dispense medicines of qualified medical practitioners unless this is done by a qualified compounder or under supervision of a qualified medical man passed from a recognized medical school or college.

(3) Medical Council of the Province should supply list of reliable places in India and abroad to all the chemists in the Province from where they can get their requirements. They should also solve the difficulties of the public and chemists when necessary.

(7)

By Mr. W. J. Campbell of Smith & Campbell, Pharmaceutical Chemists, The Mall, Lahore

In expressing a definite opinion on any important subject, I consider it right that one should justify one's views. On the question of pure drugs and the urgent necessity of legislation to raise the standard of pharmacy in this country, I lay claim to 24 years' practical experience in India, 5 as an assistant and 19 in business for myself in Lahore.

Having that experience behind me I feel qualified to express an opinion on the subject of this enquiry.

There is not the slightest doubt that India is flooded with adulterated drugs. It is a cheap market and the demand for cheap drugs smothers every effort on the part of the doctor to get the best therapeutic results. This applies equally to the doctor in private practice and to the medical officer in Government service. The slogan is 'Buy in the cheapest market' and I can assure you that too often quality is merely a secondary consideration. The extra cost of the pure article thus defeats the best efforts of the physician.

Innumerable drugs are offered for sale at impossible prices in comparison with the cost of the genuine article whilst the drug market is almost entirely in the hands of illiterate dealers possessing little knowledge of pharmacy and often without education of any sort. This makes it impossible for the conscientious dealer to meet competition legitimately.

The grants made by district boards and municipalities are frequently totally inadequate and consequently the purchasing power of the Civil Surgeon or medical officer is very restricted. He is compelled either to cut down quantities or buy drugs of doubtful quality.

As the dealer is immune from penalties and the chief factor is cheapness, can you wonder at the state of affairs that exists to-day? I am decidedly of opinion that the sale of drugs and chemicals for medicinal purposes should be controlled and that legislation is essential. In support of my argument I submit—

* (1) a comparison of prices current in Bombay with c.i.f. list prices offered by English houses for genuine article;

† (2) a list of important drugs and chemicals in every day use found to be adulterated or inert.

Coming to pharmacy, I consider there is great necessity for uniform system of pharmaceutical education all over India and this could be worked in conjunction with medical colleges or other educational institutions in the principal cities, for instance, the Medical Colleges of Lahore and Amritsar.

Qualification and registration should be compulsory. No one should be allowed to open a chemist's shop or to use the title 'Chemist and Druggist' unless he possesses the necessary qualification.

The sale of poisons and narcotic drugs, such as morphia and cocaine, should be restricted to qualified chemists, instead of being sold indiscriminately by unqualified dealers. The 'Poisons Act' as it exists in this country is, in my opinion, a farce.

What applies to the civil population, should also apply to Government, local fund and municipal institutions. In each case the dispensing department should be in charge of a qualified chemist, instead of a sub-assistant surgeon, who has had comparatively little training in pharmacy.

The functions of a doctor and those of a chemist should be distinct. Where the private practitioner runs a dispensary and dispenses other than his own prescriptions, instead of employing a compounder with no qualification on a very limited salary, he should be compelled to employ a qualified chemist to supervise dispensing.

My experience is that compounders in the Punjab, although I employ the best type I can find, have very little education. Their knowledge of chemistry or any of the allied subjects is practically nil. The best type available is the man that has been trained to dispense medicines under a qualified European chemist and they command good wages, but few exist. Even they are completely at a loss if anything out of the ordinary turns up involving chemical reaction or technical knowledge. It is practically impossible to get an experienced and reliable dispenser. I have employed compounders who have held responsible positions in Government hospitals and found I had to train them as beginners. It is for reasons such as these, that I bring qualified chemists out from England to assist me Their job is mainly supervision and depends on the technical knowledge they possess.

I consider that compulsory pharmaceutical training and education on sound lines is absolutely essential, both for chemists and compounders. It will raise the status of the 'so-called' present day chemist and attract men of better education to the ranks of pharmacy in India.

In course of time, it should provide an outlet for the higher educated young men of to-day, who, after college education, are limited in the choice of a career. There is plenty of room in pharmacy, especially in India for men of education and business acumen.

From newspaper reports I notice that protection for the Indian chemical industry has been advocated and that it should be subsidised by the imposition of increased duties on imported drugs and chemicals.

Candidly, I consider the existing 15 per cent duty on imports is more than sufficient and, if the industry cannot flourish on that, it must be a weakly child.

Years will elapse before India is able to manufacture chemicals in sufficient quantities and of sufficient purity to meet all her requirements.

The imposition of increased duties would be a severe hardship both to the poorer classes and to Government and charitable institutions. Education will remedy that quicker than protection.

Technical knowledge is of far more importance than extra duties.

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* See page 253 infra.

† See pages 253—254 infra.

Difficulties may be encountered in introducing and enforcing legislation in connexion with a 'Food and Drugs Act' and a 'Poisons and Pharmacy Bill,' but, when you consider that both these subjects concern public health and efficiency, legislation appears to me to be absolutely essential.

List No. 1

A comparison in prices (1 *pound quantities unless otherwise stated*)

Drug or Chemical.	Bombay price.		English price.			c.i.f.
	Rs.	A.	£	s.	d.	
Acid boric	0	4	112 × 1″ Pkts.		6½	Approximate.
Balsam Copaiba	1	2	0	3	0	
Creosote Beechwood	1	10	0	2	8	
Emplast Belladonna	1	0	0	2	2	
Extract Belladonna Virid ..	2	6	0	6	9	
,, Cannabis Ind per oz.	1	12	0	16	0	
,, Cascara Sag. Liq. ..	1	5	Spirit duty extra.	0	2	2
,, Hyoscyami	3	0	0	8	6	
,, Ipecac Liq.	10	0	Spirit duty extra.	0	17	6
Ferri et Quin Cit.	4	8	0	13	0	
Oil Anisi	1	5	0	5	9	
,, Cinnamoni	2	4	1	10	9	
,, Copaiba	1	10	0	4	0	
,, Crotonis	6	0	0	17	3	
,, Juniperi	1	10	0	6	9	
,, Menth pip.	2	2	0	13	3	
Potass Acetas	1	2	0	2	4	
Pulv. Ipecac Co.	2	8	0	6	9	
Syr. Ferri Iodide	0	15	0	2	2	
Ung. Hyd. Fort	1	8	0	4	5	

List No. 2

Some fraudulent and adulterated drugs and chemicals.

The Indian market is flooded with spurious drugs and chemicals which are certainly cheap, but worthless as medicinal agents. These adulterated and fraudulent products are too numerous to enumerate but the following examples may suffice.

The products are listed under two heads, (1) Chemicals, (2) Drugs.

Chemicals

Acid boric (*Boracic acid*).—Numerous samples analysed did not conform to the standards set forth in the British Pharmacopœia in that they contained arsenic and other impurities.

Bismuth carbonate, Bismuth salicylate and Bismuth subnitrate.—Several samples analysed were found to be roughly half the proper strength. That is, they contained 40 per cent and less Bismuth oxide instead of the standard laid down in the B.P. (which should be 82 per cent in the case of Bismuth carbonate).

Caffein citrate found to be adulterated with Potassium citrate.

Cinchona febrifuge (under a German maker's name) proved to be nothing but powdered cinchona bark, worth about Re. 1 per pound.

Ferri-et-quinine citrate.—Numerous samples analysed did not conform to the standard laid down in the B.P. which should contain 15 per cent pure anhydrous quinine alkaloid (equal to about 20 per cent quinine sulphate). The majority of samples contained less than 5 per cent quinine while some contained no quinine at all. The latter proved to be Ferri-et-Ammon Cit. Viride (green citrate of iron and ammonia) which is about one-fourth the price of genuine Ferri-et-quinine cit.

Iodoform.—Adulterated with sulphur.

Potassium citrate.—Adulterated with Potassium carbonate.

Potassium iodide.—Short weight ; also adulterated with potassium bromide.

Quinine sulphate.—Adulterated with chalk.

Tablets Quinine bismuth containing only about 1 per cent quinine, the balance being chalk and other insoluble matter.

Sodii iodide bottles so labelled were found to contain sodium chloride with no trace of sodium iodide.

Drugs

Extract Belladonna viride.—Samples analysed were found to contain no trace of alkaloids of Belladonna leaf.

Extract Ergot liq.—Samples physiologically tested were found to be quite inert.

Many a woman in child birth depends for her life on this drug which should be active and not inert.

Extract Ipecac liq.—Samples analysed were found to be half strength while two samples contained no trace of alkaloids of Ipecacuanha root and were probably prepared from some other valueless root.

Extract Cascara Sagrada liq.—Proved quite inert.

Essential oils of aniseed, cajuput, cinnamon, chenopodium, cloves, cubebs, dill, juniper, nutmeg, peppermint and sandal were all found to be synthetic and valueless as medicinal agents.

Pulv. Ipecac co. (Dovers powder) which owes its medicinal value to ipecac and opium was found to be composed of one-fourth the proper strength of ipecac and no opium at all.

Pulv. Glycyrrhiza co. (*Compound Liquorice powder.*)—Several samples examined did not conform to the B.P. in that they were prepared from liquorice root which was not decorticated. (The bark of liquorice root is worthless as a medicinal agent and should be eliminated.)

Syrup Ferri Iodide.—Several samples analysed proved to be deficient in iodide of iron. Some were half strength and others one-fourth strength.

Ung. Hydrary (*Blue Ointment*) should contain 30 per cent mercury; several samples were found to contain less than 10 per cent mercury.

Camphorodyne, Chlorodyne, Confection of Senna, Glycerine, Belladonna and Vinum Ipecac were all found to be deficient in medicinal agents some to the extent of 50 per cent.

Tinctures and Liquid Extracts.—Few answer B.P. tests.

(8)

By Beli Ram & Brothers, Proprietors, National Pharmacy, Lahore

1. *Quinine tablets.*—Made locally generally contain chalk with a bitter taste of quassia, or burnt alum. These have been made and sold in considerably large quantities throughout Sindh, the Punjab and the United Provinces at ridiculously low rates of Rs. 1-8-0 *dozen bottles of gr. 1; Rs. 2-4-0* per dozen bottles of 100—gr. 2 or Rs. 3 to Rs. 7 *per lb. loose tablets.*

2. We obtained several samples of solid and liquid extracts: Ext. Ipecac liq., Ext. Taraxaci liq., Ext. Glycyrrhiza liq., Ext. Cascara, Ext. Damiana, Ext. Colocynth; they were offered to us practically 33 per cent to 50 per cent cheaper than the standard B.P. quality, which gave us ground for doubt for quality; so these samples were forwarded to Messrs. Smith, Stanistreet & Co., for test and report. Although all these preparations were clearly marked B.P. on the labels, yet the report received showed that none of them was B.P. and they were one-fourth of the strength as required by the B.P. It is not understood how these preparations were passed by the Customs, as generally such preparations with wrong descriptions are taken under the Merchandise Act and before they are passed importers are required to stamp them with correct description. As to quality, all these preparations referred to above were made by a German firm.

Chlorodyne and Camphorodyne.—These two important medicines which are very largely used on the Indian market are sold at so ridiculously low prices that it is absolutely impossible to produce the right stuff even in India to compete against the imported stuffs which are offered so cheap. Chlorodyne is sold at Rs. 1-6-0 and Camphorodyne at Rs. 1-10-0 per lb. while the Indian made quality we sell is at Rs. 1-14-0 and Rs. 3-4-0 respectively. From the reports received from the consumers it is found that these things have failed to produce any effect even when they were administered in doses four times the quantities as prescribed in the B.P. Chlorodyne and Camphorodyne referred to by us are manufactured by English and German firms.

Synthetic oils on the Indian market.—We give below a detailed list of the oils taken from one of the latest lists received from Bombay and we have compared the prices with foreign imported oils of B.P. quality:—

			B.P. Oil.
		Rs. A.	S. D.
Oil Ajowan	quoted in Bombay list	1 2 lb.	13 6 lb.
Oil Anethi	Do.	4 0 „	13 0 „
Oil Anisi	Do.	1 5 „	5 0 „
Oil Clove	Do.	1 12 „	9 6 „
Oil Cinnamon	Do.	2 4 „	9 0 „
Oil Citronella	Do.	1 4 „	3 4 „
Oil Copaiba	Do.	1 10 „	3 8 „
Oil Cubebs	Do.	4 10 „	4 6 „
Oil Lemon	Do.	3 8 „	5 6 „
Oil Menth Pip	Do.	2 2 „	9 6 „
Oil Rosemary	Do.	1 7 „	3 6 „

We did not have any chance to see the quality of these oils, what they are like, but their quality can be well judged from the prices which stand against them. These oils are manufactured by certain French, Holland and German firms.

Pulv. Ipecac Co.—Without Narcotic.—In consideration of the high cost of opium and restrictions imposed by the Government on its import from foreign countries, the German firms have omitted, the most important drug, opium, in order to lower the price without having given any consideration as to whether it could produce the desired effect when prescribed by the physicians. It will suffice to mention that this stuff has been sold on the Bombay market in large quantities at prices ranging from Rs. 2-2-0 to Rs. 2-5-0 lb.

Ext. Ergot Liquid.—Manufactured by several German firms is not even half of the strength selling in the Bombay market.

Ferri-et-Quinine Cit. Special.—Contains 4 per cent of quinine against the 15 per cent strength required by the B.P. This cheap stuff is in demand from grocers and hakeems who take it on account of its cheap price. In our opinion if such bogus drugs which are dumped on the Indian market by foreign manufacturers be checked by law, the consumers can certainly derive more benefit by using genuine article at higher price. Ferri-et-quinine cheap is made by German and Italian firms.

Quinine Ethylcarb.—Coming from foreign firms seems to have been adulterated freely with *Benzo Naptha* and it is done to supply the Indian market with cheap stuff at lower prices.

In conclusion we may add that the drugs, etc., received from E. Merck, Stafford Allen & Co., Howards & Sons, Schering Kahlbaum, Johnson & Sons, Bayers, with whom we are continually dealing, are quite good and there has been practically no chance of complaint of quality of drugs supplied by them. Regarding Indian made tinctures, we have been exclusively selling Smith Stanistreet brands and received rare complaints regarding their quality during the past ten years. We cannot express any opinion on tinctures made by others as we never had the chance *to handle* them.

We are of opinion that before any Drug Act is enforced in India, there should be formation of schools of pharmacy, where compounders could be qualified as, at the present stage, there is great difficulty in getting trained and qualified hands, the compounders available from the hospitals are not competent enough to work at the chemists' shops.

There should be a pharmaceutical society who could take the control of drugs and medicines in their hand and all such drugs which are selling with secret formula, should be stopped altogether as they prove some times dangerous to the consumers. The patent medicines coming from America, every one of them has full description of composition printed on the bottle.

(9)

By Mr. D. R. Mawnay, Proprietor, Raja D. Mawnay & Co., Wholesale Chemist, Madras

[Agents for Dr. Bose's Laboratory, Ltd., Calcutta, for Madras Presidency and Messrs. May & Baker, Ltd., London, Manufacturing Chemists, London. Proprietors, Agents and Distributors of several Proprietary medicines.]

I have been carrying on a wholesale chemists and druggists trade for the last 21 years and with previous experience of 7 years altogether making 28 years.

I have found during my career as a wholesale chemist that a lot of inferior drugs which do not conform to the British Pharmacopœia are imported by many chemists in Madras and palmed off as B.P. drugs throughout the Presidency to retail chemists and medical practitioners at cheaper prices to capture the business and, on account of that, firms of reputation who import only high class drugs that conform to the standard of British Pharmacopœia had to suffer owing to this unhealthy and spurious competition.

I supply off and on to Native States of Mysore, Travancore, Cochin and Pudukottah and was always confronted with the difficulty of low prices owing to the inferiority of drugs for which my rival firms quoted their prices and unfortunately none of the States have chemical laboratories to test and find whether these cheap drugs supplied conform to the standard of British Pharmacopœia.

I know from experience that many medical men complain that Santonin was ineffective and even when a double dose was administered they do not have the desired effect and I know for certain that this drug is adulterated with Phenacetin.

I also know that Ext. Ergot Liquid although labelled as B.P. imported by some of the chemists, does not contain sufficient quantity of Ergot as required by British Pharmacopœia and is sold 50 per cent cheaper than the Ext. Ergot Liquid issued by Dr. Bose's Laboratory, Limited, Calcutta, and Messrs. May & Baker, Limited, London.

I have also known that some manufacturers of Calcutta whose name I am not prepared to disclose have flooded this market with spirituous and non-spirituous preparations which do not conform to the standard of B.P. and many of my customers have told me this during my travels throughout the Presidency.

I am of opinion that legislation must be enacted to put an immediate stop to this fraud committed continuously and it must be restricted to Allopathic medicines only. Central laboratories must be established where all drugs must be tested before they are allowed to enter the market and, in case they are found to be of inferior quality, the legislation must be such as to destroy the goods and penalise the exporting firm.

I am also of opinion that no orders should be allowed to be placed with firms either in England, Europe or in India which are not recognized by the Government of India and even then no orders are to be placed with such of those firms who do not have accredited agents or representatives in important centres such as Bombay, Calcutta, Madras, and Rangoon, who shall be responsible on behalf of their exporting firms for any cheating or fraud committed by them, as according to the present Indian Customs Act the importer is held responsible for any mistake or fraud committed by the manufacturer or supplying firm. Take for instance, if the manufacturer intentionally or unintentionally omits to put the country of origin on any merchandise, it is the importer that is held responsible and penalised which is highly wrongful to punish a man for no fault of his. I am also of opinion that no Allopathic medicines should be handled except by qualified hands and the minimum qualification that would be required to meet the situation would be that of a qualified compounder,

As regards indigenous drugs, I am of opinion that, since we have no Indian Pharmacopœia, no restriction or legislation could be effectively imposed on these drugs until such a time that an Indain Pharmacopœia comes into existence and only medical practitioners passed out from the Government Indian School of Medicine are allowed to prescribe and practise Indian medicines.

As regards proprietary medicines, I am of opinion that the rules governing this trade in England may be applied in India for all proprietary articles made from Allopathic drugs, of course, with the exception of those that have open formulas.

As regards proprietary medicines made in this country with known and unknown drugs, I am afraid that there will be any amount of trouble to impose any restriction as I have known certain proprietary articles whose formulæ will not be disclosed by the proprietors owing to the fact that some of them had to spend a life long time in discovering and inventing, for instance, Chathukutti Vydier's cholera specific known as vishuchika samhari or pilco is a real specific for cholera and is used not only in Malabar but all over India with cent per cent success and it was discovered by the late Chathukutti Vydier whose name remains in Malabar as a household word for the treatment of cholera.

In the circumstances, the Committee will do well in confining itself to introducing legislative safeguards for the protection of Allopathic drugs and leave out for the present indigenous drugs and their preparations.

(10)

By Mr. T. S. T. Chari, B.A., A.I.I.Sc., Chemical Examiner to Customs, Madras

Central Institute for testing drugs to work in collaboration with the existing pharmacological, customs and excise laboratories

1. *Necessity for a central institute.*—Pharmacological laboratories exist at present in the following places: Calcutta, Bombay, Madras, Lucknow, Lahore and Patna. The usefulness of these institutions will be very much increased if the work done in these laboratories is correlated. For doing this and several other things to be described later on, the formation of a central institute is absolutely necessary.

2. *Location of the Central Institute.*—To derive the maximum benefit of such an institute, it must be situated in or near one of the bigger business centres like Bombay or Calcutta. The institute will get considerable inspiration for work from being in the midst of big manufacturing and importing chemists and druggists, public and private laboratories, and hospitals.

3. *Function of the Institute.*—The function of the Central Institute will be—

(*a*) to correlate the work of the different laboratories;

(*b*) to standardize the methods of analyses followed in the different laboratories;

(*c*) to give a preliminary training to candidate selected for posts in the pharmacological laboratories;

(*d*) to arrange for leave reserve when any officer of the pharmacological laboratories goes on leave;

(*e*) to investigate on behalf of the Local and Imperial Governments drug problems directly bearing on the health and welfare of the public;

(*f*) to undertake extensive research in indigenous drugs;

(*g*) to explore in collaboration with the Agricultural Department the planting and cultivation of plants not indigenous to India with a view to making India self-sufficient from the point of view of drug requirements and also to assist in the cultivation on a commercial scale of such of the plants as have been proved to be of a therapeutic and economic value.

4. *Qualifications of the director.*—In order that the aforesaid function of the Institute may be achieved, it must be in the hands of a director who is a first-class live pharmacologist with a sound knowledge of chemistry. He must have excellent research experience, a good business acumen and proved ability to initiate lines of research in the different laboratories and

control the same. It is also essential that he must have a sound experience of the drug trade. The salary may be fixed at Rs. 1,500—50—2,000. I am aware that, for a man of the type mentioned above, this salary may not seem attractive. If such be the case, a higher salary may be offered and the man appointed on a short contract, say, five years, and at the end of the period the renewal of the contract will solely depend on the quantity and quality of the work turned out during his term; the value of such work is to be judged by an authority appointed by the Government of India—may be in the nature of a reviewing committee.

5. *Location of Drug Institute in the Tropical School.*—If it is agreed that Calcutta or Bombay would be the most suitable place for this institute, I would strongly urge the location of the Central Drug Institute either in the School of Tropical Medicine and Hygiene, Calcutta, or the Haffkine Institute, Bombay, where the necessary facilities by way of staff and equipment already exist and suitable additional facilities by way of extension of buildings, staff and equipment may easily be provided to cope with any additional work. The considerable amount of research work that is being done in such institutions under expert guidance and control will act as an incentive and will accelerate the future work of the Drug Institute.

6. *Control of laboratories.*—While the pharmacological laboratories will be maintained by and her subject to the administrative control of Local Governments, the Central Institute will be maintained by the Government of India, and will have the technical control of the Provincial laboratories.

7. *The Indian Institute of Science, Bangalore.*—Excellent facilities already available at the Indian Institute of Science may be availed of in connexion with indigenous drug research. Steps should be taken to secure the co-operation of the institute authorities in this direction.

8. *Provincial pharmacological laboratories.*—These will be in charge of chemists—men with Honours degree in Chemistry or its equivalent with three to four years' research experience in a good laboratory. The following staff may be required:—

(1) Pharmacologist (*Gazetted*)	...	...	500—25	—1,000
(2) First Assistant (*Gazetted*)	...	...	300—20	— 500
(3) Second Assistant (*Non-Gazetted*)	...	...	200—12½	— 300
(4) Two laboratory attenders	...	...	30— 2	— 50
(5) One animal attendant	...	...	25— 1	— 35

9. *Work in pharmacological laboratories.*—The work of these laboratories will be—

(*a*) to report on the samples of imported and indigenous drugs submitted;

(*b*) to undertake, on payment, analyses of indigenous medicines at the request of manufacturers, the scale of fees for such analyses to be fixed by the Central Drug Institute. (The fees derived from this source are to be credited to Government),

(*c*) to carry on the research work initiated by the Central Drug Institute and in certain cases to carry on independent research on problems expected to produce important results.

It is presumed that the Director while initiating the lines of research will encourage initiative in original intelligent research undertaken by provincial laboratories.

10. *Existing pharmacological laboratories to continue.*—The existing pharmacological laboratories will continue with such modifications as may be found necessary to fit in with this scheme.

11. *Study leave.*—Study leave on full pay may be necessary to the workers to go abroad and be acquainted with the nature of work done in similar institutions. Applications for study leave will be considered by the Director only when submitted by experienced and able men who may be relied upon to increase the usefulness of their assistance to their departments on return.

12. *Publication of results.*—In co-ordinating the results of work of the several laboratories, the Director of the Central Drug Institute may necessarily require a medium for publishing the results. To begin with, the *Indian Medical Gazette* and the *Indian Journal of Medical Research* may be availed of for the publication of results and, as the volume of work increases the necessity for a separate journal of pharmacology may be considered.

13. *The customs laboratories.*—The Customs laboratories in the ports of Calcutta, Bombay, Karachi, Madras and Rangoon would in my opinion form useful and valuable units in any scheme for the control of the potency and purity of drugs. The Customs chemist assisted by the medicine appraiser will be able to lay his hands easily on imported drugs of a spurious nature. If he has reasons to suspect any drug, he will report the matter to the Collector of Customs who would send the sample sealed to the pharmacologist for examination. Facilities for a biological assay do not exist at present in Customs laboratories and, if it is desired that an examination of the drug from all points of view should be made at the very place of entry, the present laboratory attached to the department would have to be suitably extended and equipped so as to include in its scope the assay of the potency and purity of drugs. The present staff are not qualified to undertake pharmacological work.

14. *The Excise laboratories.*—The control of opium, ganja and the issue of such articles for manufacturing purposes are in the hands of the Excise Department. Indigenous preparations made with these drugs can occasionally be seized from the premises of the manufacturer by Excise Inspectors and submitted through the heads of their departments to the pharmacological laboratory for test to check whether the normal dosages prescribed are not likely to lead to wrong or fatal results. Further the Excise laboratories test tinctures, extracts, etc., manufactured locally. Any preparations suspected to be of an inferior quality may be forwarded by the Excise chemist through the Commissioner of Excise to the pharmacological laboratory for test.

15. *Section 56 of the Merchandise Marks Manual.*—The description B.P. should be regarded as false unless the composition is in accordance with the standard. In the case of chemical estimations, these could be determined with the present facilities in the Customs laboratories. But in the case of preparations like Ext. Ergot Liquid, besides the above determinations, a biological assay should also be done to test the potency of the drug. This could be done by the pharmacological laboratory. I consider that the section could be used effectively against spurious B.P. preparations.

16. *Sections 274 and 275 of the Indian Penal Code.*—These sections are effective. The existing laws with respect to drugs—though perhaps not full and detailed as they ought to be and even though they do not cover all the possible offences with respect to food and drugs, still on account of the absence of a vigorous and active public opinion and an efficient machinery for the administration of the existing provisions by way of detection and punishment—appear to have been consistently ignored by the public, the manufacturers and the dealers. With the growth of the variety and number of artificial foods and drugs, the problem is becoming more and more acute since the possibilities of exploitation of the public are correspondingly increasing. Province after Province in India has found it necessary to pass the Food Adulteration Act. But since drug adulteration is more easy and mischievous than food adulteration, a standard legislation embodying the results of experience of the existing legislation of the Provinces in India and the Food and Drugs Acts in England is urgently called for. In such legislation special attention will have to be given to the machinery for prevention and enforcement and the punishment will have to be deterrent in cases of known, deliberate and repeated violations. Undoubtedly this, like any other enactment affecting public health and welfare, will be dependent to a large extent on public opinion and support for its efficacy. But it may be trusted that, with the growth of education, public conscience may become more active and energetic.

(11)

By the Chemists and Druggists' Association, Madras

Standardization

Now that the Allopathic system of treatment has come to stay, it is quite essential to adopt a definite pharmacopœia and have the medicines conformed to the particular standard laid down in the pharmacopœia. The British Pharmacopœia is being followed, but not the standard fixed therein.

The absence of any legislation in India is taken advantage of and all kinds of preparations manufactured in Europe and America are dumped down in India callously. Though we have no contrivance to analyse the imports and find out whether they are of correct standards as laid down in the British Pharmacopœia, we from our experience find that some preparations are not what they profess to be, as they deteriorate in colour and effect if allowed to rest for some time. Though no importer or agent would knowingly place any order for impure preparations or drugs of low standard, yet we are compelled to go in for drugs of lower prices to meet the competition and out of regard for the high-sounding names of the exporting firms or manufacturers. It is not possible to judge the genuineness or the *bona fides* of the firms from the lists and circulars received. Here, it is the duty of the Trade Commissioner for India or similar agencies in foreign countries to act as our Intelligence Bureau and issue lists and other particulars at fixed intervals explaining who are the *bona fide* merchants who can be relied on for our supplies. And also the newspaper organizations have to take some trouble to ascertain if all the advertisers are genuine firms and are in a position to handle orders which they advertise for. In the absence of correct guides the importers are carried away by the attractive advertisements of the pushing agents. Even the Chambers of Commerce are not giving the required help and the merchants are always kept at respectable distances from being approached easily. All these have to be organized to give proper help to the importers. At important importing centres, laboratories should be equipped for full analysis of drugs and a central office for registering all proprietary medicines should also be established on the lines of patent registration offices of the West. For all known and approved remedies offered for sale, a system of fixing distinct stamps can be introduced to help the consumers. But in the case of secret remedies whose authors do not allow analysis, a prohibitive duty should be levied.

Indian preparations.

So far as the indigenous system of Ayurvedic, Unani and Siddha are concerned, it is presumed that it is not the intention that the present Committee should make any recommendations.

Compounders or dispensers.

Qualification for these is another question for which the Committee is taking evidence. There cannot be any difference of opinion as to the advantages of giving better training to the compounders. But the men who are already engaged in the profession satisfy the ordinary requirements. In this Province there are two classes of people who are engaged in dispensing medicines, viz., chemists and compounders. The chemists have to undergo two years' course, while the compounders are required to undergo a course of nine months. The possession of a two years' course is certainly advantageous; but, for practical purposes, the compounders' training is quite sufficient. The compounders now in service do their work quite well.

Poison and Pharmacy Act.

The introduction of an all-India Act on the lines of the Act in England is a real necessity, as, at present, different rules are observed in several Provinces and there is no uniformity.

(12)

By the Havero Trading Company, Limited, Calcutta

I beg to give you the following details in addition to my verbal proposals.

On account of the well-known fact that patent medicines and drugs of minor quality circulate widely in India, we consider it a matter of utmost importance to have a medical control board established by the Government of India, which exercises its control in the following lines.

Every manufacturing firm has to give on the label of their products not only the name and the indications for which the product is used, but also a correct designation, which chemical compound is present in the preparation, if possible with exact formula, and furthermore how much per cent of the

active therapeutic agent it contains, as far as fluid preparations, lotions, ointments, etc., are concerned. Here if possible even the quality of the solvent, etc., ought to be given. This designation given by the firm enables the control board to have the preparation tested in its laboratories and it is an easy matter to find out by chemical analysis, whether the compound corresponds to the formula given on the label in the percentage mentioned thereon.

We give you an example regarding investigations in our own laboratory. Protargol 'Bayer' is a silver proteinate with 8·3 per cent of organically combined silver. The ordinary silver proteinates are known on the market mostly as 'Protargol' also. We have tested products of various makes as to their therapeutic qualities and found that the amount of silver was lower in good many cases, even as low as about 2 per cent. Besides, concerning their purity and dissolving properties, they proved to be below the level, and consequently may develop irritating qualities, harmful to the patients.

In special cases the chemical combination alone is not sufficient to ensure a certain standard, as for instance in the case of the preparations of the arsenobenzol type. Here every preparation of this kind ought to have a manufacturing date on the label which enables the physician to know at a glance how old the preparation is. We give as example our Salvarsan preparations, which bear the manufacturing date on the label, and as a rule no decomposition is to be expected in tropical climate within the next two years. Our Salvarsan preparations are officially tested by the Government Institute for Experimental Therapy in Frankfurt (standard test of the League of Nations), and no batch leaves the works without bearing a corresponding remark. The control board by this means has a control of the supplies circulating on the market and a touring officer belonging to this control board can easily trace preparations in stocks with the chemists bearing too old labels. These measures may be done in co-operation with the firm or agents in India, who are likely to be in a position to give information as to where trade with too old stocks is suspected. A special arrangement with the Custom authorities certainly will always prohibit import of stocks from other countries than the manufacturing place, and the control board from its part ought to insist on special remarks on the label by the manufacturing firm like—

> "Specially manufactured for the tropics and packed for British India, Burma and Ceylon. Imported by Messrs. Havero Trading Co., Ltd.,"

as it is the case with all the Salvarsan preparations of M.L.B. Such a remark enables the firm itself to control supplies and makes it obvious to the control board whether stocks circulated in India are imported from other countries than the manufacturing place (indirect imports). For those cases, where alterations on the label may take place in India itself by passing through the trade, they will soon come to the notice of the firm and of the touring officer of the control board, who can prove falsifications or alterations by his collection of standard labels and packings in possession of the board.

In the case of official drugs, it may be possible that they are purposely sold in inferior quality by the manufacturers from the very beginning or they may undergo falsifications by passing through the trade. It would be the duty of the board to trace those inferior products, investigate them in their laboratories, and, if they do not come to the standard required, to stop further sales of them.

Biological preparations.—Every serum ought to bear on the label the number of antitoxin units present either as International or American Units. Besides the expiration date, as being most important, must not be omitted. The standardization of the serum ought to be controlled as it is the case with sera of M.L.B., and Bheringwerke, which undergo a permanent test in the Government Institute for Experimental Therapy in Frankfurt-on-Main and bear on the labels a corresponding remark. Those firms that do not submit themselves to Government control ought to be controlled permanently by the control board itself, to make sure that they really come up to the standard mentioned on the label.

Glandular products, vitamins, etc., ought to bear a certain remark on their label as to how much of active principle they contain, tested by means of clinical units, as for instance in the case of *pituitary* gland extract

(posterior lobe) by Voegtlin Units, etc. The influence of the climate ought to be considered in this designation also, and exaggerted claims for therapeutic value, that could not be substantiated, should be forbidden after examination in the laboratories of the control board (e.g., vitamin preparations).

The import or manufacture of patent medicines, etc., without any clue to their composition, generally, ought to be prohibited by the control board, In practical consideration of a rigorous measure like that, of course, concessions must be made for certain Indian drugs on the market, that have proved to be of therapeutic value, but not yet exactly chemically defined.

Summary.—There must be a Medical Control Board in existence in India for the control of pharmaceutical trade. The Board must be a Government body, with permanent residence where special chemical and pharmacological laboratories are at its disposal, with a staff of experts in the different lines. Manufacturers and dealers of pharmaceutical preparations in foreign countries importing to India or firms manufacturing and dealing with pharmaceutical preparations in India itself be submitted to special regulations and restrictions as pointed out above by means of which the practical control exercised by the Government Medical Control Board is facilitated. If a firm breaks the rules, knowingly or unknowingly, issued by the Medical Control Board, further sales of the preparations are to be stopped until the rules issued by the Board are fulfilled and the preparation is up to the standard the Board prescribes. Patent medicines giving no clue to their chemical combination are prohibited, under the exception mentioned above. Touring officers belonging to the Control Board enforce the practical observance of the measures by means of permanent control of chemists and dealers. The import is controlled in co-operation with the Customs authorities. Breach of the rules ought to be published officially in an important Indian Medical paper bringing it to the knowledge of the physicians. The question of restricting the profession of pharmacy to duly qualified persons ought to be considered and the means by which it is practically possible be provided.

(13)

By Dr. K. S. Ray, M.A., B.Sc., M.B., Ch.B. (Edin.), Joint Honorary Secretary, Indian Medical Association, 6-A, Corporation Street, Calcutta.

We have the honour to acknowledge receipt of your circular letter, dated the 2nd September 1930, with a copy of the questionnaire issued by your Committee for the members of the medical profession.

Our Association feels that, whilst under other circumstances and in more favourable times the desirability of such an enquiry might be admitted, considerable misgiving prevails amongst the members of the independent section of the Indian medical profession as to its necessity at the present time. It is apprehended that some of the findings of this Committee will be used with the ulterior purpose of prejudicing the position of the infant drug industry in this country. This belief is strengthened by the fact that up till now very little effort has been made by Government to help this industry by State aid towards manufacture or by supporting the consumption of the products by using them in Government hospitals. This indifferent attitude of the Government has been responsible for making India a good dumping ground for foreign drugs and preparations. It is widely believed that the nascent indigenous manufacturing concerns will not get justice through the enquiry that has been set on foot and that many of them may be unjustly condemned. Colour is lent to this apprehension by the fact that, although it was as far back as 1927 that the Resolution for the appointment of such a committee has been passed by the Council of State, it was not given effect to until a few months ago, when manifestations of a strong national desire for using indigenous preparations and drugs became noticeable. It is strange that for 150 years of British rule no such solicitude has been evidenced for the control of drugs in India. In 1929, out of Rs. 2,01,84,000 worth of drugs and medicines imported into India medicines worth Rs 88,99,000 came from the United Kingdom. It should be noted that, though the Food and Drugs Act in the United Kingdom makes it compulsory to examine all drugs and food substances consumed in the United Kingdom, the products for export to India are beyond the provisions of this

Act. This apprehension is also to a certain extent supported by the fact that in the composition of the Drugs Enquiry Committee although a place could be found for a representative of a British firm no room could be found for a representative from an Indian manufacturing firm. Our Association apprehends that no useful purpose will be served by a committee, constituted as it is, without properly qualified expert personnel to represent the various aspects of the chemical, pharmaceutical and biological drug trade.

In paragraph 3 of your letter under reference the following statement appears: "It is well-known that many unscrupulous people, realizing that to analyse and standardize medicinal preparations requires experienced men and expensive and elaborate laboratory equipment, take advantage of this knowledge to carry out extensive adulteration, use inferior drugs, and, in the case where raw material is expensive, purposely reduce the quantity that should be used in order to sell it at a low price. This is not only carried out in India but some European firms export medicines specially manufactured for the eastern bazaars." Our Association finds it difficult to accept this statement in the absence of accurate and proper evidence. If this had been the real state of affairs any effective control over them would mean the creation of well-equipped laboratories and test houses under the conduct of honest, impartial and competent men who enjoy the confidence of the public in different parts of India as a first and essential requisite. It is doubtful whether the Government would in the present state of financial distress be in a position to find money to give effect to the recommendations, which may be made in this behalf, in the near future. The detection and collection of sample, etc., would require elaborate staff in addition to officers who would have to be employed in analysing and carrying on the standardization of drugs and medicines in the different laboratories all over India. Whereas, on the one hand, we do not find the picture as gloomy as depicted in your statement quoted above, we do not, on the other, see our way to support a scheme of control organized under Government, particularly as their attitude towards Indian manufacturers is not likely to be sympathetic and unbiased. Further, there are ample reasons to apprehend that a quasi-official controlling body created by official legislation should only introduce an engine of oppression in a field in which signs of healthy development are already noticeable. And when the proper time came it may be desirable to appoint a sympathetic and enlightened, competent and interested controlling agency for the purpose of giving guidance and prompting the progress of the young concerns through co-ordination and co-operation.

As regards the question of enquiry preliminary to control, we are of opinion that the whole of the drugs and preparations trade should not be placed on one uniform level—there must be differential treatment for indigenous products including manufacture from foreign products. The former should be carefully handled, nursed, helped and supported and encouraged in every way. No restricting or cramping or pruning or devitalizing legislation should be made applicable to them at this stage. Guidance is required and must be provided with sympathy.

As regards foreign products imported into India, an enquiry might be desirable. But, as we have shown, the machinery required for giving effect to the findings and conclusions of the enquiry would be extremely expensive and, if formed under the prevailing circumstances, can hardly be expected to do justice to different parties concerned.

But the Association feels that the present political situation is not the proper time for the introduction of legislation of such great importance. Before any legislative action is introduced, standards for the drugs should be set up and this can be done by the compilation of an Indian Pharmacopœia and by intensive research work. In the compilation of such a pharmacopœia, three categories of drugs will have to be incorporated: (1) Preparations taken from pharmacopœias of other countries, (2) those indigenous medicines which have been already scientifically studied and standardized and can therefore be forthwith incorporated, and (3) those indigenous medicines which have been found efficacious on clinical trial but which require further investigation. This means that a good deal of research work will have to be carried out to obtain the necessary knowledge about these preparations and to determine their standards of purity and efficacy. *Pari passu* with research work, extensive testing of drugs prepared in, or imported into, India will

have to be done in various testing laboratories in different parts of the country. To establish standards, we shall have to study the methods developed by the various League of Nation Committees, American and German Pharmacopœis as also those in Great Britain. This means that we shall have to devote, at least, the first ten years of this scheme to study and to research with a view to gain exact knowledge. When this is obtained we will have to think of legislative control. It will be seen therefore that no legislative control can be conceived for the present. It has been stated by some that India has been made a dumping ground for adulterated and inferior quality foreign medicines, but we have no exact knowledge of the state of affairs prevailing. We do not know what preparations are adulterated and to what extent, and what preparations are under-strength. Unless and until we have exact scientific information about it, legislative control could not be justified. We would like to point out in this connexion that in the composition of the Pharmacopœia Committee should be included all the available talents and special workers in the country and that it should not be an *ex parte* committee haphazardly made like the present one.

Our Association feels that, owing to poverty, a very great bulk of the population in the villages and small towns resort to the indigenous systems of treatment. Though statistics as to the quantity of the different kinds of drugs manufactured locally and consumed are not available, the figures of the imported drugs and medicines available show that the Western system of treatment can be resorted to by a small proportion of the population only. It follows, therefore, that if any legislation is undertaken for ensuring the purity of drugs, it should not be confined to drugs used by one small section of the population, viz., those resorting to the Allopathic system of treatment only. As to how the drugs, etc., prescribed or manufactured according to the indigenous systems of medicine could be tested, our Association has no suggestions to offer as they have practically no knowledge of these systems of medicines or of their pharmacopœia.

Our Association is of opinion that the profession of pharmacy should be restricted to qualified persons. In this connexion our Association is of opinion that there should be provision for the training of pharmaceutical chemists and pharmacologists because, without such well-trained personnel, it would not be possible to utilize the enormous raw material that exists in India for the manufacture of drugs which are at present exported abroad and brought back to India in the form of finished products at high cost. Our Association believes that the best method of assuring the purity of drugs, etc., at a cheap cost is by manufacturing them in this country with the help of trained staff and under adequate supervision. Every possible means should be adopted to develop the pharmaceutical industry in this country, if necessary by bounties or protective tariffs. The various Universities in India may also be requisitioned for helping in the matter of training of pharmacists and pharmacologists. Pending the creation of the training facilities of these pharmacists and pharmacologists every effort should be made to improve the training of the compounder class.

In conclusion, our Association would like to point out certain difficulties with regard to the drug trade in India: (1) There is no system of sampling of raw materials of good quality; the result is that the manufacturer often does not know how much of finished product of the required potency he would expect from a certain supply of raw materials. It is the duty of the State to develop this line of vast indigenous drug trade. (2) Unnecessary restrictions and tortuous procedures are imposed by the Excise Department in certain Provinces regarding the import of alcoholic medicinal preparations from other Provinces. For example, the Governments of Bombay and Madras realized duty on all alcoholic medicinal preparations imported into their Provinces and have developed intricate procedures in the issue of import permits and collection of duty on arrival at destination. It may be pointed out that, in the case of alcoholic preparations imported into India from foreign countries, there is no restriction regarding the export from one Province to another after the duty has been once paid at the port of landing. In this case alcoholic medicinal preparations manufactured in India have to work at a disadvantage when compared with similar foreign preparations introduced into India. Further, Bengal-made rectified spirit or absolute alcohol has been prohibited into the Punjab and restricted in the Central Provinces, United Provinces and Bihar and Orissa. This is a great handicap for the manufacturers.

In this connexion, our Association would like to point out that a liberal supply of duty-free alcohol would be allowed in all *bona fide* research laboratories engaged in medical research, if we conceive that it should be the aim of the Government to help the indigenous drug industry.

(14)

By B. K. Paul & Co.

Drug control in India

I. *Difficulties from the point of view of the Indian importer*—(*a*) Want of proper control over the imported *foods, drugs, chemicals, proprietary medicines and finished medicinal preparations.*—The post of appraisers should be restricted to distinguished Science graduates with honours in chemistry. The standard of technical training should be higher with arrangements for special training. Appraisement Department should have its own chemical, analytical and biological laboratories.

(*b*) The Food and Drugs Act in existence in the exporting countries not applying to the drugs and foods exported to India, many unscrupulous manufacturers outside India export cheap defective preparations to meet the requirements of equally unscrupulous dealers. Instances are known and may be cited if necessary when one or two reliable manufacturers even were found to export preparations which were defective and below the standard if not positively harmful although there was nothing on the labels to give rise to any such suspicion. The countries of export should be approached for enforcing their Food and Drugs Act against all exportable products as none of them come under the purview of the Act in force in those countries. This is particularly necessary as against the exportable Foods. *The imported drugs, chemicals and finished medicinal preparations* should bear on the label, besides the name of the country of origin, *the name of the manufacturer, the strength of the preparation* and *in unambiguous terms the standard followed.* Ferri-et-Quinine Citras '*Special*' found in abundance in the Indian market contains only 4½ per cent quinine. A good deal of Pot. Iodide B.P. found in the Indian market contains an admixture of a fair quantity of Pot. Bromide. It is a pity to note here that the Indian Merchandise Act which can effectively handle the question without the help of any other separate enactment is running the risk of becoming a dead-letter law for want of proper countenance. *The imported proprietary medicines* should bear on the label, besides other things, the names of *all the ingredients actually used in the manufacture.* Besides satisfying the provisions of the Indian Merchandise Act and the Customs regulations they should also pass the scrutiny of a board specially constituted for the purpose before they are allowed to enter the Indian market. The literature on these medicines, claiming the special efficacy in the particular diseases, should first be submitted to this board for examination and if necessary should be modified.

(*c*) The importation of drugs which deteriorate rapidly in the Indian climate should either be completely checked or partially restricted. Unqualified dealers may unwittingly, and sometimes to avoid incurring loss, sell them even after they are of doubtful therapeutic activity.

II. *Difficulties from the point of view of the Indian manufacturer*—(*a*) *Want of proper cultivation of medicinal plants.*—Government should take up the question and start plantations in suitable regions in India. Government cinchona plantation at Mungpoo may try, on a small scale, growing of other medicinal plants suitable for that altitude. Strict supervision of the mode of collection and storage. Licence to respectable growers. Special training to Indian science graduates to encourage them in this profession.

(*b*) *Want of proper control over the imported crude drugs, chemicals and other ingredients.*—Most of the crude drugs imported from outside being cultivable in India a little attention in this respect can solve this difficulty. The difficulties attending the procurement of imported chemicals and other ingredients suitable for manufacturing purposes may be effectively removed, till we can have them locally made, by means suggested in the different sub-headings under the heading '*Difficulties from the point of view of the Indian importers*'.

(*c*) *Inelastic Excise regulations.*—Should have provisions to accommodate the growing needs of the infant trade. The old arrangement of the Excise Department regarding a central analytical laboratory still exists. Excessive delay in consequence. These laboratories. may be abolished. Inspectors and sub-inspectors, on the other hand, should be given special training to make them competent enough to carry on analytical work in the bonded laboratory premises with a view to check the spirit strengths of the preparations declared by the bonders with the minimum delay. This is a crying need in every bonded laboratory now. No restriction on imports and exports of rectified spirit, alcohol absolute and spirituous preparations into and from the Provinces *inter se* should exist as in the present days. Whatever might have been the ulterior object of these restrictions, the public in the less advanced Provinces are suffering to a great extent due to the circulation of defective preparations given rise to by the withdrawal of the fair competition obtaining so long. These restrictions should be immediately removed. Adjustment of duty may be done by book transfer in the Province of export as was formerly done. *Excise establishment cost.* Formerly bonded warehouses bore only a share of the actual cost up to a maximum limit of Rs. 150 per month—vide Tinct. Rules Prel. Sec. 2. Now the whole of this cost has to be borne by the bonders. It is seldom less than Rs. 300 and, in most cases, more than Rs. 500 per mensem. More sympathy and co-operation from the Excise officers is needed for this infant industry.

(*d*) *Prevalence of high transport charges within India.*—The freight for the distance between two places in India is in many cases higher than that between London and Bombay. Better facilities should be given in this respect. This is necessary not simply for the immediate object of supplying the Indian public in the less advanced Provinces with the standard quality of spirituous preparations but for the more important object of rousing the consciousness of the people and thereby effectively checking the tendency of the new bonders to have unfair competition by issuing cheap spurious preparations and pass them off as B.P. or other standard preparations.

III. *Difficulties from the point of view of the Indian dispensing chemist.*—(*a*) No arrangement for the testing of the standards given out on the labels of imported drugs being in existence now, every respectable Indian chemist, although he places reliance on the first-rate European manufacturers, has got to get preparations in doubtful cases analysed and tested to satisfy himself. Although occasional examinations will be necessary, the chemists will be helped a good deal and the public, in turn, will be greatly benefited if there is sufficient check from the Customs Department.

(*b*) Non-restriction of the profession of pharmacy to duly qualified persons gives rise to unfair competition. It is prejudicial to the interests of the public. Immediate legislation however will not be beneficial. This question too should better be handled till we have adequate arrangements for the training of pharmacists as in the more advanced countries.

(*c*) *The present Poisons Regulations need modifications.*—Technicalities should be simplified. Delay and trouble have restricted the use of many drugs coming under this head. Cost increased due to restriction against supply of some preparations coming under this head per post parcel.

(*d*) *Indiscriminate use of cheap minim and measure glasses imported from outside India.*—They have practically flooded the market. Immediate restrictions should be made against the use of these. Further inroad should be stopped to put an effective check in this regard. This remark also applies to the weights used in the dispensing department.

IV. *General observations.*—(*a*) The control of adulteration of drugs inside India should better in the present stage be entrusted to the different municipalities in India who may incorporate the Calcutta Municipal Act, 1923, in so far as it relates to the question under reference into their Statute Books with necessary modifications.

(*b*) It is impracticable to formulate a scheme at this stage regarding standardization of preparations made from indigenous drugs; while research work has established the therapeutic virtues of many of these, the great reputation of some has suffered a good deal. The question should better be handled after we have an Indian Pharmacopœia which we believe engages the special attention of the Chairman of the Committee.

(c) The increasing sale of proprietary remedies with secret formulæ is producing a harmful effect. The manufacturers should be compelled to give the ingredients on the face of the labels. So long as nothing is found in a proprietary medicine crossing the limits of safe dosage the disclosure of the exact proportion may not be insisted upon.

(15)

By Lieut.-Col. R. Knowles, I.M.S., Calcutta

In my capacity as Editor of the *Indian Medical Gazette*, I see a good deal of the problems with which the Committee is faced. The whole question of counterfeit drugs was dealt with in an editorial in the *Indian Medical Gazette* (September 1927, page 515). One element of difficulty in the situation is the willingness of lay newspapers throughout India to accept advertisements of faked and fraudulent drugs. In one instance, Messrs. Parke, Davis & Co. took legal action against two drug vendors for selling spurious imitations of three of their preparations. In a second case, Messrs. Parke, Davis & Co., B. K. Paul & Co., Messrs. Bathgate and Co., and the Bengal Chemical Co., jointly took action against two drug vendors for fraudulent imitations of their labels. In India, at present, Government cannot or do not take legal action against those who sell fraudulent drugs, and it remains for the reputable chemical firms whose drugs, packages, or labels are fraudulently imitated, to bring a case in the civil courts. This costs much money, and results are unsatisfactory. Both the above cases failed on a minor point of law. In a third instance, the Anglo-French Drug Co.—as far as I remember—took legal action against the vendor of what purported to be one of their preparations; the fraud was only detected because the printer of the fraudulent label had misspelt one word on the label. In this case the prosecution case won, but the defendant was a man of straw, unable to pay a fine; therefore nothing further could be done. There can be no question as to the imperative necessity of legislation to deal with this situation. One may point out, further, that the League of Nations is taking international action with regard to the standardization of biological products, and that India will come into the purview of the League in this respect. One would refer the Committee to the original editorial for a fuller consideration of this problem.

With regard to adulteration of drugs, santonin, quinine, and cinchona febrifuge are very frequently heavily adulterated. 'Chinchona febrifuge' tablets bought in the Indian bazaars may consist of anything from sodium bicarbonate to concrete; santonin is often heavily adulterated with sodium bicarbonate. A good instance is quoted in the *Indian Medical Gazette* (September 1930, page 538). The All-India Missions Tablet Industry at Bowringpet, South India, are large manufacturers of tablets of cinchona febrifuge at a cheap rate, these tablets being reliable. They found that a firm in northern India was advertising cinchona febrifuge tablets at a rate with which they could not possibly compete. A supply of these tablets was purchased on the open market and sent to the Chemical Examiner with the Government of Madras to examine; he reported that the cinchona alkaloid content of the tablets was less than half of what was claimed by the manufacturers; more than 50 per cent adulteration had taken place.

With regard to the official Government cinchona febrifuge tablet, I would like to point out that it is too hard and too insoluble. Experimental observations which I have myself carried out this year show that the absorption of it is very irregular, in some patients a good deal is absorbed, in others none or next to none. This tablet needs improvement to render it more soluble and more easily absorbed.

Reports by Colonel (now Major-General) Megaw, I.M.S., on analysis of stock quinine mixtures in hospitals and dispensaries will be found in the *Indian Medical Gazette* (May 1928, page 245 and July 1929, page 378). With the help of Dr. Sudhamoy Ghosh he devised a simple apparatus for testing the quinine content of stock quinine mixtures, and the strength of potassium iodide mixtures. (This apparatus has just recently been put on the market in portable form by Messrs. Boots & Co.) A medical man, disguised as a patient, went round a whole series of hospitals and dispensaries, complaining that he was suffering from malaria, and asking for quinine mixtures; other specimens were taken without previous notice at official inspections of dispensaries. In Bengal, stock quinine mixtures

which were supposed to contain 10 grains of quinine to the ounce were found to contain from 2·56 grains to 7·3 grains to tht ounce; the dis—pensaries on tea estates were the gravest defaulters, and there can be but little doubt that much quinine is stolen and sold, as its market price is so high. In Madras, stock quinine mixtures which were supposed to con-tain 10 grains to the ounce were found to contain from no quinine at all to 7·2 grains to the ounce. This was mostly in rural dispensaries.

In passing, I should like to draw the attention of the Committee to an important article on method and economy in choosing and buying drugs for large hospitals by Dr. H. O. Chapman in the *China Medical Journal* (February 1927, page 141. A considerable extract from it was published in the *Indian Medical Gazette*, June 1927, page 345.) This describes the system in vogue at the Hodge Memorial Hospital in Hankow, and shows how to effect both economy and efficiency in routine dispensary work.

The *Indian Medical Gazette* (November 1930, page 640) has already published an editorial on the Drugs Enquiry Committee* with an appeal to the medical profession throughout India to come forward with infor-mation, and including a detailed copy of the questionnaire. If there is any other way in which the Gazette can be of help to the Committee, I should be only too glad to know of it.

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* *The Drugs Enquiry Committee, India*, 1930 :—In a recent editorial (The *Indian Medical Gazette*, Volume LXIV, 1929, page 389) we have dealt fully with the present most un-satisfactory state of affairs in India with regard to the preparation and sale of drugs. Fraudulent imitations abound on the Indian market, and the only remedy appears to be for the firms whose drugs are imitated to take legal action. 'Cinchona-febrifuge' may consist of anything from sodium bicarbonate to concrete. Santonin is often badly adulterated on the Indian market. Further, there is no standard for such potent and important remedies as the pentavalent compounds of antimony so widely used in the treatment of kala-azar; preparations of digitalis, even when made by well-known firms in Europe and America, may degenerate under tropical conditions; and arsenical preparations for the treatment of syphilis and yaws are tested only in the stock held by the Medical Store Department. The position, in fact, is one in which neither chemist, doctor, nor patient can be certain that what is being prescribed is being dispensed, and taken by the patient. Several of the well-known chemical firms in India have established laboratories to deal with this state of affairs, to examine and test the products which they import or manufacture, but they constitute the honourable exception and not the rule. 'Bazaar medicine' is all prevalent, and the present unfortunate boycott of British-made and reliable drugs still further adds to the difficulties of physician and patient in obtaining reliable and efficient medicinal remedies.

The appointment of this Committee, we hope, marks the beginning of a new era for medicine in India. We look forward to a day when India will have its own pharmacopœia, based largely upon minerals and plants obtainable in this country, with standardized pre-parations and assay laboratories; there is no reason indeed why India should not, in the future, have a large export trade in medicinal plants, rather than be dependent almost entirely on imported chemicals. We hope that the Drugs Enquiry Committee, India, will have the fullest and most cordial co-operation of the entire medical profession throughout this country, for its appointment is the first step towards clearing up a most difficult and even dangerous situation.

The Indian Medical Gazette, September 1927.

Counterfeit drugs

India may be truly described as the land of quacks, of quack doctors, quack medicine mongers, quack dentists, quack medicines, quack opticians, quack faith healers. In Western countries such as the United Kingdom, and above all in the United States of America, stringent laws have been passed against the baneful activities of such persons. But in India, despite Medical Acts and Provincial Medical Councils, they flourish as do the wicked, like the green bay tree; their activities are unlimited; they appear to be above the law; one has only to open the daily edition of anyone of even the leading and most influential newspapers of India to find their advertisements broadcast in its columns. There are newspapers in India which we cannot hope to reform; but the fact that reputable, responsible and highly influential daily papers should lend their columns to advertisements from such quack vendors of 'get-well-quick' cures is deplorable. One such 'medico,' we note, advertises in a most influential Calcutta daily paper that he practises near the south-west corner of the Victoria Memorial in Calcutta. We have looked for his dispensary in vain in that quarter but presumably it is in some neighbouring *basti*.

The present position, in brief, is one which most vitally affects both the general public and the medical profession in India. Bad enough as it is, it is rendered still worse by the existence of vendors of counterfeit drugs. And this problem affects everybody in India; the medical profession first and foremost, the general public secondly, especially that portion of it which resides in mufassal areas and out of reach of chemists' shops of first-class and reliable reputation and thirdly—and especially—the reputable, ethical, and well established British, American, and Indian firms of chemists who do a large business in India.

Our protest against this state of affairs has been called for by the results of certain recent prosecutions in the civil courts against vendors of counterfeit drugs.

In the first case, Messrs. Parke, Davis and Company, the well-known manufacturing che-mists, brought an action against two drug vendors for supplying a Calcutta practitioner with spurious imitations of Liq. Sedans, Cascara Evacuant, and powdered Taka-Diastase.

(16)

By Dr. S. C. Sen Gupta, M.D., F.R.C.S., Captain, I.M.S. (Retired), Professor of Medicine and Therapeutics, National Medical Institute, Calcutta

In a place like India where 90 per cent of the people live in villages and where besides Allopathic system, Ayurvedic and Hakeemi and Homeopathic lines of treatment are in vogue, legislative control of drugs on British or American lines are beset with immense difficulties. Yet, I realize the importance of making a beginning.

The policy of the State has so long been one of non-interference in relation to non-Allopathic drugs or lines of treatment. I do not suppose that policy is intended to be altered or reversed, as any attempt at reversal will raise a storm of protest. It has to be admitted that indigenous systems are holding their own, both in towns and villages, even amongst the educated class, in spite of immense State help for the Allopathic system, and in spite of the fact that followers of Allopathic system are generally trained and qualified men. That such a large number of sick people frequent these flourishing indigenous practitioners (who are their own chemists and handle most powerful poisons like arsenic, nux-vomica, datura, etc.; freely, without any kind of State interference) is not to be explained away by saying that

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In the second case, two Calcutta men were proceeded against by Messrs. Parke, Davis & Co., B. K. Paul & Co., Bathgate & Co., and the Bengal Chemical Company, for having in their possession blocks from which could be made very passable imitations of the labels of the firms concerned. Both cases failed on a minor point of law, but Messrs. Parke, Davis & Co., and the other firms concerned are to be congratulated on taking the action that they did.

In India, at present, the vendors of fraudulent drugs can only be prosecuted in a civil court. This involves the issue by a magistrate of a search warrant, a measure which is extremely wasteful of time. That this is so is exemplified in the second of the cases mentioned above, in which one of the accused, scenting that something was in the wind, promptly disappeared somewhere into the mufassal and kept out of the clutches of the police while the case was proceeding. In the United Kingdom and in the United States of America, we understand that such search warrants are unnecessary. We firmly believe that, if the law of this land had been different and the police had been empowered to make an immediate search of the premises, when the matter was reported to them, and to prosecute criminally, the delinquent would not have had the opportunity to abscond.

There is therefore an opening here for the application of a concerted, well organized pressure of public opinion.

The matter should not be left as it is, for the general public, the medical profession, and every reputable firm of chemists and druggists in the country are vitally concerned.

In the long run, surely, the weight of public opinion must tend to bring the law in this country into line with that in the United Kingdom and in the United States of America.

As the law at present stands, apparently the only remedy that the reputable firms have against disreputable ones is to prosecute them one by one as their delinquencies come to light. This, however, costs money. In fact, we have lately had an instance where a recognized Indian firm, manufacturing a certain chemical antiseptic, decided not to bring a case against a rival firm who were using what the former claimed to be their protected trade mark, on account of the expenses of prosecution involved in High Court cases. Clearly, therefore, the law needs amendment in this matter. At present, the question of Food and Drugs Act, similar to that which holds in the United Kingdom and in the United States of America, is a matter for each individual Province, since all such medical and public health matters are 'transferred subjects' under the Montagu-Chelmsford Reforms Act. India, through her Imperial Government, can still present a united front to the world and to the League of Nations with regard to precautions in her maritime trade and on the subject of overseas communicable diseases; but the question of fraudulent drugs and chemicals is one for the consideration of the Provincial Legislatures concerned.

We believe that, if the Provincial Medical Councils would bring their activities to bear on this subject, the respective legislatures could be prevailed upon to make effective provision in the law, thus rendering it possible to prosecute criminally those responsible for misdemeanours such as we have referred to above. In the meantime, although these two prosecutions have failed, they have laid bare the facts to a greater degree than was previously realised, and have served the purpose of a warning to our readers and others to resist the temptation of buying from sources other than those which they know to be reliable.

The Indian Medical Gazette, July 1929

The need for a Therapeutic Substances Act for India

With the rapid advance in the sciences of pharmacology and chemistry, the number of new drugs that are added each year to the pharmacopœia is very great and is increasing year by year. While many of the new drugs are extremely valuable to the physician, others are useless and some are actually harmful. In most countries there are regulations which exercise a rigid control over the nature and the quality of the drugs placed on the market, but in India no regulations exist, either to prevent the importation or the manufacture within the country of valueless or harmful medicines.

people are hopelessly conservative. There is no doubt that these practitioners cure diseases and hence is their popularity. From all these facts it will be apparent that no strong *prima facie* case can be made out for any material change from the pre-existing policy of the State.

If vaids and hakeems are to be left untouched, it is difficult to see how the State can usefully control the Allopathic drugs with proper benefit to the consuming public whose interest must be supreme. There are very few proper chemists and druggists in India as yet. Medical practitioners are vitally interested with the drug trade. Hence it does not seem proper to adopt strong measures against Allopathic practitioners and druggists, leaving others to flourish all the more, without any State intervention. If that be done some allopaths will transfer their allegiance to hakeemi or ayurved, and quacks will swell their ranks and market will be flooded with spurious preparations, secret remedies, crude drugs and chemicals and under-strength preparations under hakeemi or ayurvedic names. Such preparations will often defy any known modern method of analysis. Hence I suggest that whatever scheme of control is suggested it should not leave non-Allopathic systems altogether immune.

There is no question about the desirability of having drugs and chemicals of proper quality. There is no doubt that drugs of defective strength are imported, manufactured and sold to the public as genuine, sometimes. It

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During the last eight years a large number of both imported and locally manufactured drugs have been tested in the pharmacological and chemical laboratories of the Calcutta School of Tropical Medicine and Hygiene; many of these have been found on biological assay to possess only a fraction of their claimed therapeutic activity or, in a few instances, to be totally inert whereas, in the case of others, it has been found on chemical estimation that a greater portion of the alkaloid or other substance, which they were supposed to contain, has been replaced by some inactive material. Determination of the real quality or genuineness of drugs on the market is outside the scope of the general medical practitioner; he looks to the State for guidance and protection.

The climatic factor is an important one; high atmospheric temperature combined with high humidity accelerate deterioration during storage. Tinctures which when they leave England or the United States may be fully potent are frequently considerably below the pharmacopœial potency when they are given to the patient. Some years ago a number of samples of digitalis issued by well-known firms were tested and it was found that in nearly every instance 30 to 40 per cent of deterioration had occurred. Most of the arsenicals of the salvarsan group undergo a slow chemical change during storage; this change, which is considerably accelerated in the Indian climate, not only decreases their efficacy but may increase their toxicity to a dangerous extent. In our last number we published a letter from one of the leading manufacturers in Germany warning the public against purchasing certain of their own preparations which had been condemned in Europe and which they suspected, had been brought to India by unscrupulous importers.

In the United States of America, the Government controls the remedial agents by means of an inter-state (i.e., central) commerce clause of the constitution. Under this Act the "Food and Drugs Act" is enforced by the Bureau of Chemistry of the Department of Agriculture while the sale of biological products such as serums, vaccines, etc., is controlled by the Public Health Service. Not only is control exercised over all drugs, serums, etc., that are meant for home consumption, but all substances belonging to this class which are imported or exported are also governed by the Act. The Act is designed to secure truthful names and reliable statements for all the remedial agents *and* is divided into two parts.

Part I of the Act is concerned with patent medicines and drugs which are advertised, mainly in the lay press and are usually purchased by the layman himself, and Part II applies to medicines ordinarily prescribed by physicians. This Act ensures that the purchaser, whether a physician or a layman, secures an honest product. It means that pharmacopœial preparations must *come* up to the standard laid down in the United States Pharmacopœia, failing which the manufacturers will be prosecuted. In the case of patent medicines, the law requires that only those claims should be made which can be substantiated, and in this way it controls exaggerated claims, and misleading and false advertisements. Standards are provided for most of the biological products. In the case of preparations for which tests of standards are incomplete, the samples are sent to the Government Laboratory with a copy of the records of the maker's tests, and these are repeated and the preparations are finally passed for sale or rejected. The toxicity of each batch of organic arsenical products is tested before it is allowed to be sold. No licence is granted to any firm until the licensing authority is satisfied that the personnel and equipment of the firm is qualitatively and quantitatively efficient for the purpose for which the licence is sought. In addition to this licensing system, samples of finished products are brought in the open market and are tested by officers of the Government with regard to their purity and potency. By these activities a constant control is kept over these drugs, and the postal authorities are responsible for the prevention of frauds and exploitation through the post. The powers of the postal authorities in this respect are shown by a recent occurrence. An individual was advertising a fraudulent specific; all letters addressed to him were opened at the post office and, if found to relate to this specific, were stamped "fraudulent" and returned to the sender.

In the United Kingdom, until quite recently, the purity of food and drugs was dealt with by the 'Sale of Food and Drugs Act of 1875 and the Amending Act of 1879.' These Acts make it an offence to sell to the prejudice of the buyer, food or drugs not of the nature, substance or quality demanded, or to mix or sell food and drugs with substances injurious to health. These Acts lay down no standard for either food or drugs, provided the analyst's certificate states the nature and extent of the adulteration, but various regulations made under the Act define the standard of purity for milk and milk products. The British Pharmacopœia, which

is also a fact that a few genuine manufacturers are finding it hard to compete with those making and selling understrength preparations. There is no doubt that some remedy has to be thought of and applied. But it is difficult to devise correct, just and suitable remedy. It is not merely a question of setting up a most expensive laboratory and engaging experts, but it implies maintenance of proper vigilance constantly for all times. This probably implies frequent police interference, and I feel certain that bribery and corruption of worst type will be rampant, sale of inferior drugs and preparations will continue, the prices of drugs will sore high, there will be less consumption and more opportunity for vaids and hakeems. I presume that the State will realize a great portion of its initial and recurring expenditure by indirect taxation out of the consumers. Hence it is reasonable to argue that prices of drugs will go up beyond the reach of a great bulk of sufferers. I am not at all certain if the ailing public is going to get compensating advantages. Here in India we should not expect as yet same degree of purity of drugs and perfection in dealing either, as it obtains in Great Britain or America. Hence legislative control ought to be very slight and elastic in the beginning. But strict laws or any attempt at their vigorous enforcement, will frustrate the very object and the trade will suffer.

Since receiving your note, I have consulted some local dealers, manufacturers and practitioners. I found that the questions in possession of some of them are somewhat different. They expressed that the Government, so long asleep, have suddenly awakened to the sense or necessity of supplying the public with purer drugs and chemicals, after the recent attempt at

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is an official publication under the Medical Acts of 1858 and 1862 'containing a list of medicines and the manner of preparing them, together with the true weight and measures by which they are to be prepared and mixed', although not a legal standard under the Food and Drugs Act, is, as a matter of fact, usually accepted as such, in that the court will usually admit as *prima facie* evidence that a drug should correspond with the description of it given in the British Pharmacopœia.

The 'Therapeutic Substances Act' was introduced in 1925. This Act controls the quality and authenticity of such therapeutic substances as cannot be tested adequately by direct chemical methods. These are divided into three groups. Group I consists of biological products, such as vaccine, toxins and antiserums. Group II includes substances such as organic arsenicals and antimonials. Group III is formed of insulin and other gland products. The manufacture of these substances is carried out by properly licensed firms who conform to the standards of strength and purity laid down by an appointed committee.

In India, public health being a Provincial subject, the question of adulteration of food and drugs has been left to Provincial Government and local bodies. The Calcutta Municipal Act of 1923 makes it an offence to sell adulterated or impoverished drugs. The Bengal Food Adulteration Act of 1919 refers to foods only, as do most other provincial Food Adulteration Acts, with the exception of that of the Punjab which also includes drugs. In the Bengal Act standards are laid down for six notified foodstuffs, but in none of the Acts are there any legal standards for drugs. We are not aware of any prosecutions under the Drugs sections of these Acts having been instituted; the difficult question of standards would at once arise and local bodies are not likely to take the trouble and bear the expenses of test cases. These Acts are therefore virtually dead letters as far as the control of drugs is concerned.

So that, for all practical purposes, with the exception of the Poisons Act, 1919, there are in India no laws which regulate the importing, manufacturing, advertising or selling to the public of therapeutic substances of any kind, potent or inert, benign or harmful. The time has perhaps not yet arrived when legislation could be introduced on American lines controlling the advertising and the sale of fraudulent specific and patent medicines for which extravagant claims are made: the practitioners of the various systems of medicine would immediately demand that all the drugs not used by them should be placed under a ban and we should certainly demand that a number of drugs used in the indigenous systems that we have tested and found valueless should be proscribed. But we do consider that some legislation should be introduced, with reference to drugs used in modern scientific medicine, to protect, primarily, the patient, who is liable to be dosed with useless or dangerous drugs, secondarily, the doctor who has no guarantee that the patient will receive drugs of the nature and potency which he prescribed and, finally, the honest manufacturer or importer who at present is compelled to compete with unscrupulous opponents.

If laws are to be passed insisting on drugs being of a certain standard, the first step must be a decision on the matter of standards. The simplest method would be the introduction of an Indian Pharmacopœia. With the help of the British and American Pharmacopœias this should not be a very difficult matter, but it will take time; meanwhile the British Pharmacopœia could be adopted as the standard.

The therapeutics substances for which legislation might be introduced fall into two classes: the imported, and the Indian manufactured products.

Imported drugs and other therapeutic substances.—At the present time the great majority of the therapeutic substances used by practitioners of scientific medicine in India are imported. In most instances these are manufactured by reputable firms who employ a staff of chemists and pharmacologists, but as there is practically no control over imported drugs there is nothing to prevent inferior, useless and dangerous drugs being brought into the country. In most of the foreign countries from which drugs are imported there is a strict control of all drugs manufactured for home consumption, but in some of these countries this control is not extended to drugs made for export. Here the question of climate, referred to above, comes in; drugs which may be fully potent when they leave their factory may have lost much of their potency by the time they are landed in India

boycott of British drugs. They opine that the real object is to enforce British drugs and chemicals on Indian public and to thwart manufacture of drugs by indigenous agency. I do not subscribe to this view. Still I do not think it will be of use to anybody to alienate the feelings of practitioners who form after all the most important factor in the drug trade, and who know best how to make propaganda and circumvent ways of evasion of most stringent laws. They suggest that local manufacturers of drugs and chemicals must be encouraged and supported, and I agree. Steps should be taken at the same time to encourage pharmaceutical industry. It must not be put under undue restriction. What we want here at present is quantity, ere long we shall be able to enforce quality. I very much doubt if the time has yet come to stop the import or manufacture of drugs of defective strength altogether. I would allow such drugs being sold, provided correct strength is truly stated on the front labels. The same rule is to apply to all proprietary drugs whether imported or not, whether they come under Ayurvedic or Hakeemi names. Similar restrictions are to be enforced over the British Pharmacopœial preparations, where also the chief constituents and their percentage strength are to be correctly stated. Biological products are to be left alone at this stage. Manufacturing firms are not yet to be compelled to employ high salaried experts, but they are to be given to understand that after a given period experts will have to be employed compulsorily. No step need as yet be taken against chemicals as production here is very limited and they have yet to build up a reputation. Chemicals are

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Under the League of Nations' agreement, the Customs authorities are compelled to exercise control over certian narcotic drugs, and in addition they have the power to exclude and confiscate drugs whenever actual fraud can be proved, as in the case of drugs marked 'B.P. standard' which fall below this standard. They have their chemical laboratories for testing these drugs, but they do not assay them biologically.

The powers and responsibilities of the Customs authorities in this respect might be increased. It might not be practicable nor even advisable, for them to set up their own laboratories for carrying out biological assays, but they could pick out samples from each batch and send them to some central laboratory. The problem with regard to imported therapeutic substances would not end here; during their voyage to India they are only subjected to adverse climatic conditions for a comparatively short time, but the time that elapses between their arrival in India and their consumption by the patient may be, and in most cases certainly is, very much greater. Another method of checking imported drugs would be for Government Agents to purchase samples from retail dealers and to send them to be assayed. This measure would lead to a greater knowledge of the keeping properties of various drugs and other therapeutic substances, but by itself would achieve little else. The dealer's stock, which might be very small, could be confiscated but, unless he is to be given some guidance in the matter, it would be unfair to penalise him further for purchasing what he honestly considered a potent drug. It would not be fair to penalise the manufacturer or the importer, who may have respectively prepared and landed in India a potent drug, which, if kept under favourable conditions, would have retained its full potency for a number of years. One thing that could be done is to insist on each bottle or packet having stamped on it the date of manufacture, the date of arrival in India and the date up to which it may be expected to retain its full potency or a large percentage of its potency—the percentage being specified—if kept under reasonably satisfactory conditions. At the same time, rules for the storage of therapeutic substances could be formulated. Thus, by systematic examination at the port of entry and by sampling the stock of retail dealers, the responsibility could be placed and the right person penalised. The work of the Customs authorities would not be as great as it at first appears. As we have said, the majority of the imported goods come from respectable firms who test their goods thoroughly before sending them out; the testing of such goods would be merely *formal* and would only have to be done from time to time.

Indian manufactured therapeutic substances.—Many of the plants from which pharmacopœial tinctures are made grow in India and during recent years an increasing number of firms have been established for the manufacture of tinctures and other similar substances for use in India. The time may not be far hence when, instead of these raw materials being exported, we shall manufacture, these drugs ourselves for export. Some of these firms are also manufacturing gland extracts, vaccines and serums, and others are preparing and placing on the market potent organic compounds of antimony for intravenous administration. At present few of these manufacturing firms have any arrangements for assaying and standardizing the potency, or testing the toxicity of the drugs they make; this can usually be done by biological methods and a trained staff is necessary. There is in existence no law to prevent these untested drugs being placed on the market, or to prevent different batches of a preparation of antimony, for example, which bear the same label varying from time to time both in composition and in toxicity, and always differing materially from the compound which they claim to be.

The manufacturers of therapeutic preparations should be compelled to hold a licence, which licence should only be given to those manufacturers who comply with certain regulations.

One of the principal conditions should be that they maintain a trained staff for testing and assaying the preparations which they place on the market. Government Agents should be permitted at any time to enter the factory and take samples. At the same time samples would be collected from retail dealers as in the case of imported drugs, and, as the climatic conditions are as likely to cause the same deterioration in locally made drugs as in imported ones, the same rules as to labeling and dating each packing would have to be applied In the case of antimonials and of arsenicals, the relative toxicity and the percentage content of antimony or arsenic of each batch would have to be declared and some indication of their

used for purposes other than medical. As we go on, experience will teach us if any control requires to be exercised over any particular substance or substances.

Side by side, some control should be exercised over dispensaries, more than what obtains at the present time. Contrary to doctor's direction, often costly drugs are either left out or insufficiently given in a mixture or a pill. This abuse has to be stopped. Arrangement should be made in all important capital or Presidency towns to have suitable analytical laboratories, to prevent fraudulent dispensing.

A central laboratory has to be established and maintained in India with adequate number of properly qualified and experienced experts under a governing body consisting of one or two of these experts, three or four eminent private practitioners who are in touch with the ailing public and who should have some teaching and hospital connexion, one or more reputed druggists of India, one representative of Indian Medical Association, one representative of the Municipal Corporation of the place where this central laboratory will be located, and one or two representatives of the Government. Then the medical and other public will have confidence, co-operation will be forthcoming and control is likely to be more effective. Otherwise, the suspicion that prevails in the mind of many, and of which mention has already been made, will be stronger. This should not be allowed to occur.

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keeping properties given, so that the public would be safeguarded against high toxicity and gross variations in composition. It might be suggested that in the case of a small firm, who made perhaps only one drug, this would impose a great hardship. Provision could possibly be made for a small concern of this nature having their preparations standardized or tested in some Government laboratory for a fee, but their preparations would be subsequently subjected to the same scrutiny as those of the larger manufacturer.

Without the introduction of any new and drastic laws, a considerable amount of control of manufacturers of therapeutic preparations could be applied by means of the Excise authorities; certain *bona fide* manufacturers are allowed the privilege of keeping 'bonded' stores of alcohol. This privilege could be reserved for manufacturers who comply with the regulations. As alcohol is essential for the preparation of most therapeutic substances, the withdrawal of this privilege would be a very serious matter and would prevent them placing in the market any drug, in the preparation of which alcohol is used, at a competitive price. However, it would be essential for the mechanism for sampling and testing the drugs to be in existence as a guide to the Excise authorities as, otherwise, this method would be open to abuse.

The introduction of legislation on the lines that have been suggested above is a matter for the Central rather than for the Provincial Governments. The work of testing the drugs is outside the scope of any organization at present in existence. It seems probable that neither the Customs nor the Excise authorities would care to undertake such specialized work, and it is certainly not within the scope of the Provincial Chemical Examiners or of the Public Health Laboratories, nor could it in any way be considered to be the work of the Medical Research Department. It would therefore be essential to set up a new organization under the Central Government with a number of inspectors to collect the samples and a central laboratory where these could be tested. The central laboratory would have to be well equipped and staffed with well-trained men; a pharmacologist, a chemist and a biochemist would be necessary. It is obvious that the laboratory should be situated at one of India's three main ports of entry, and, as Calcutta is far ahead of the other two towns in the matter of local manufacture of pharmacological products, it is indicated as the most suitable site. Subsidiary laboratories could eventually be established at Bombay and Madras.

It is not essential that a full working scheme should be inaugurated immediately; in fact, such a step would be inadvisable. It would be better to begin by including only a limited number of drugs, for example, digitalis, ergot and a few other galenicals, and the antimony and arsenic compounds. But it should be made possible for the number to be added to each year without the introduction of any further enactments. The growth of the necessary organization will thus be gradual.

This scheme would certainly cost money, but we do not consider that there should be any difficulty in justifying this expenditure. It is a public health measure which sooner or later must be adopted, and it is a matter in which India is far behind all other countries of a similar standing. It is certain that the introduction of legislation on these lines would very shortly react favourably on the internal trade of the country. Many doctors feel that patriotism and perhaps economy are their only excuses for prescribing locally made unstandardized products; this new measure would make both classes of drugs equal in respect of standardization, and it would then simply be a matter of individual preference or price as to which was used.

With regard to external trade, India cannot hope to compete in foreign markets under the present conditions, and, as so much of the raw materials for the preparation of medicines is exported, it is obvious that her opportunities for foreign trade are considerable. If it were considered essential, no doubt, the scheme could be made to pay its way by charging a small stamping duty on each package imported and a licensing fee for the local manufacturers, but we do not consider this at all desirable from many points of view.

The criticism which will be immediately levelled against this scheme is that it will further increase the cost of drugs used in 'Western medicine'. We are by no means certain that this will be the case. It will certainly stop the sale of extremely cheap goods in which the cheapness is only apparent; the drugs having been heavily adulterated are really more expensive than the pure product. It is, for example, not cheap to buy a 5-grain quinine tablet which only contains one grain of the alkaloid, even if it is half the price of the genuine article, and an inert drug is not cheap, whatever the cost.

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By The Union Drug Company, Limited, Calcutta

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The conditions of drug manufacture in India are beset with so many practical difficulties that further elucidation of these points is necessary than what could be cramped into the answers to a limited number of set questions issued by the Drugs Enquiry Committee.

It is about a century and a half that the Allopathic system of medicine has been officially introduced into India. Although the people, specially the literate class, have realized the value of it, not more than eleven per cent of the Indians have acquired the habit of taking to Allopathic treatment even after such a long tenure of this system in India. The reason, according to a certain section of thinkers, is that the deplorable illiteracy of the people makes them incapable of appreciating the good effects of Western medicines. But this view cannot be endorsed, because it is apparent that while many of the illiterate people do not accept Allopathic remedies, they willingly take Homœpathic drugs which are also imported to India. The correct explanation of the limited use of Allopathic drugs certainly lies in the fact that these are costlier than all drugs of the other systems of medicines prevailing in India.

It is undoubtedly true that the Government of India with the co-operation of the Provincial Governments have been always exerting to provide medical relief to the distressed through their numerous hospitals and semi-Government medical institutions. But considering the vastness of the land and its enormous population, the efforts of the Government for medical relief in India are very limited. It has been declared by the Governmont that the revenues of the State do not justify further extension of such human work. Be that as it may, it is an undisputed fact that the expenditure of the medical institutions in India works out at a higher ratio per case than any other country. Not only so, the cost of drugs for treatment and the charges for medical supervision are so disproportionately higher than in other countries that the hospitals get fewer opportunities for spending money on research work than in America, France or Germany. Although Allopathic treatment has been established in the country for such a long time, very little effort has been made by the Government to investigate the conditions which could make Allopathic drugs cheap and available to a larger circle of sufferers. It may be said that during the last fifty years scientific researches into the different branches of medicines were subsidized by the Government but such researches were confined to, more or less, finding the new drugs for tropical diseases or for ascertaining the causes of certain diseases in India. No endeavour has been made either by the Government or by any private scientists to investigate on scientific and systematic lines the question of cheapening drugs by widespread manufacture of the same in the country. It is true that we get certain records of sporadic activities by one or two chemists and medical men who carried on research into the properties of drugs used in the Ayurvedic, Unani and Tibbi systems of medicines, but we cannot lay our hands on any published record showing investigation into the possibilities of cultivation and manufacture of such drugs as are officially recognized in the British Pharmacopœia.

While I have declared with regret the tardiness of the Government in solving the question of cheapening Allopathic drugs by manufacture of same in the country, I have not lost sight of the fact that quinine is manufactured in India by the Government who make energetic efforts to popularize the same through the chain of post offices in India. But, although this useful proposition for the treatment of malaria is tackled by the Government, the price of quinine is not in any sense of the word popular with the poor. The price of Government manufactured quinine is regulated by a foreign convention, though not directly. Circumstantial evidence bears out the fact that the Government manufacture this important drug on such a small scale that they have to draw a larger supply from the convention, and naturally they have to obey the price limit fixed by the convention. It is most deplorable that, ignoring the economic value of fighting malaria with cheaper quinine by manufacturing the same on a larger scale, the Government suffer themselves to be dictated, or rather indirectly ruled by a foreign convention. Volumes could be written on this question pointing out

the inhuman character of negligence of the State in allowing the poor to die of malaria as well as the economic loss of the country by continual illness and premature disablement of its millions of men and women from malaria.

A good deal of noise is now and then made in the legislatures of the country on the malaria problem and sometimes on the sale of adulterated quinine. Temporary measures and makeshift arrangements are adopted to meet the questions which arise. But nobody has yet questioned the propriety of the Government to monopolize the quinine trade. I have used the word 'monopolize' because the attitude and the course of action of the Government do not point to anything but an intention to keep supreme control over this trade so that the interests of the foreign convention may not suffer.

Good cinchona bark is raised by the Government from their own plantations and the price of same is fixed by the Government with all eyes open to a signal from the quinine convention. Any business man naturally wonders why the Government should continue their control for such a long time over a plantation which they created as an experimental measure. It would have been more fitting for the Government to hand over the plantation after the experimental period to any energetic private firm or to encourage such plantations by private persons all over the country. Such conduct would not have been a new policy with the Government. They encourage the silk industry and other agricultural schemes on these lines. Then again the Government should have offered special inducements to private manufacturers to manufacture quinine alkaloids from the Government barks, had they thought that plantations for cinchona bark would not be profitable to private business firms. But, instead of doing anything which would induce private manufacturers to take up the proposition of quinine production, the Government have fixed the price of the bark in such a way that nobody finds it possible to sell their quinine in competition with imported quinine. Would it now be said that there is no firm in India properly equipped and fit to produce quinine alkaloids? No, such scepticism is not justifiable because Indian chemical manufacturers have produced greater things, e.g., organic arsenic compounds, bismuth compounds, antimony compounds, numerous alkaloids which have been thoroughly tested out by Government experts and which have been found to be of proper strength and uniform quality.

Another legitimate grievance which the manufacturers have against the Government is their policy of running their own tincture factory at Madras. It will be interesting to note that previous to the war, a year or two before that, this factory was not in existence. It was probably started by some official as an experimental measure—at least so goes the story round. But during the war this factory was enlarged to such an extent that it could supply all the requirements of the Government for extracts and spirituous preparations. Before the establishment of this factory the Government did not buy anything from the Indian tincture manufacturers for the numerous hospitals. But during the war very warm encouragement emanated from the Government for the production of tinctures, solid extracts and spirituous B.P. preparations not only for the needs of the hospitals but also for the requirements of the public. It is also interesting to trace the history of this tincture business in India. Previous to the origin of the Government factory the Civil Surgeons and the medical authorities of the different institutions insisted on the supply of British tinctures but when the Government factory came into being they were constantly circularized to draw their requirements from this factory through the Indian Medical Stores. The exigencies of the war revived the two or three manufacturing firms in India which were almost dead owing to lack of Government support and public demand before the war. These firms sold their tinctures to the District Boards and private charitable dispensaries as well from 1914 up to 1920. As soon as peace was restored and the war requirements of the Government disappeared, the conditions of the tincture manufacturers again became worse. Their regular clients, viz., the District Boards, were very energetically circularized through the Public Health Departments of the Provinces, advising them to buy their tinctures through these departments from the Indian Medical Store, i.e., the Madras Government Factory tinctures. Then again the public demand fell off owing to competition with spurious imported preparations, which even to this day are sold unfettered by any Government control.

It is certainly inscrutable to every manufacturer in India why their preparations should not be patronized by the Government. The Government's policy, far from being helpful and encouraging is antagonistic and keenly competitive. I have personal experience of the unfair propaganda carried on by the officials directly in control of the tincture factory in Madras. They issue a price list which on the face of it looks to be much more competitive than the prices which can be offered by a genuine manufacturer for his standardized articles. But the consumers of these articles, viz., the hospitals, etc., do not take into consideration the extra charges for containers, railway freight, etc., which happens to be a special reduced rate for Government, and claims for breakages, all of which when added up becomes higher than the prices of the private manufacturer. My firm was given an opportunity to supply the requirements of twelve hospitals in Madras because the Inspector-General of Civil Hospitals in the year 1927 was very much displeased with the quality of the products and the service offered by the Indian Medical Store. We earned the full appreciation of the authorities for the uniform quality of our preparations and for our prompt and diligent services. But the next year at the time of contract we found that the whole medical machinery of the Government of Madras have made out a case proving that our prices were slightly higher than the prices of the Indian Medical Stores. We tried our utmost to convince the authorities on the comparison of total costs for our products with the total costs of the Indian Medical Stores, but they would not see to that. There are other instances which might be cited, but it is best for the Enquiry Committee to test out the quality of the Government Factory tinctures and compare the same with the quality offered by the recognized private manufacturers.

Apart from the consideration of quality for quality and service for service both of which would undoubtedly receive the very best consideration and constant attention of the private manufacturer, we resent most strongly the policy of the Government in running a factory to compete with us. In times of emergency we are called upon to meet the situation by increasing our capacity of production at a very short notice to four or five times. But in normal times we are not only ignored but our rightful interests are injured by Government competition. Such a policy is not favoured by any Government in the world. We can legitimately ask for remedy of such harmful competition. Instead of helping to foster the trade the present policy of the Indian Government robs it of its normal life.

I have already detailed the difficulties under which we labour on account of the indifference of the Government to control the production and sale of spurious and adulterated drugs in the Indian market. I have already submitted my views on the Excise policy and the inefficient control of the drug manufacture by the Excise Department. If any one considers the prevailing poverty of the people and the prevalence of the epidemics which account for the larger death-rate than the birth-rate, the Indian Government should remit all inland duty and taxation on drugs and medicinal preparations.

As a manufacturer, I have already detailed the overpowering difficulties of manufacturing standardized drugs in India. It cannot be said that in this line India has kept pace with the advance made not only in the West but also in the Far East in the science of medicine. In Great Britain and the Continent, in America as well as in Japan, the science of drug manufacture has progressed with rapid strides with the proper backing and generous support of the State. But in India we have to depend entirely for the majority of our medicines and surgical appliances on the foreign manufacturers. This is neither prudent, as has been amply proved during the last war, nor is it economical, specially in the case of a country where a great majority of the population is poor and the national wealth is comparatively small. It is true that a promising beginning in this line was made during the war, but after it, while other industries like iron, paper, etc., received more nursing from the Government, this industry was sadly neglected. Although I have criticized the policies of the Government which are on the face of them inequitable, I am fully informed of the solemn intentions of the authorities to help India which resulted in the drawing up of the scheme for the purchase of State requirements locally. While in other lines such intentions have been given definite shapes and rules have been drawn up to give preference to the products of manufacturers in India and stockists in India, such rules are generally applied in the case of almost all the industries except that of the drug. I know of cases where the

officers in charge of purchases really intended to purchase medical requirements of the country but they could not give effect to their good intentions simply for the fact that most of the things are not produced in India. I know of other cases where, on account of the absence of the hard and fast rules for purchase of medical stores, officials give preference to imported articles even when similar articles are produced in India. It is therefore necessary to lay down cut and dry rules for the guidance of purchasing officers for medical stores. But the enactment of such laws would be premature unless the Government of India be ready to help the growth of firms who have substantiated their capability to manufacture standardized medical articles in the country.

The Government of India should therefore investigate the possibility [illegible] manufacture of modern medical articles in the country and, at the same time, the Government should invite co-operation of the present manufacturing firms to tackle the new problems. More money should be spent on research in India, because, the general labour conditions and cost of raw materials being cheaper in this country, researches could be conducted at less cost than in England and the results produced by such researches will be useful to both countries. In this connexion, I think, it is primarily necessary to investigate more thoroughly the drugs of the old Indian systems of medicine with a view to replace costlier imported articles by equally effective but cheaper Indian drugs as well as to supplement the deficiencies of the Western science. I am sure this would lead to most useful discoveries in the medical science.

It should also be very carefully investigated if an Indian Pharmacopœia could be compiled. My technical knowledge of things being very limited, I am only speaking from the general business point of view. It would be apparent to everybody from the flourishing condition of the Kaviraji drug business and the comparative cheapness of their articles. It is also an established fact that the Kaviraji drugs effect cures and they cannot be dismissed as the stock in trade of quacks. Therefore, if modern science with all its improvements be applied to make medicines from these drugs, such medicines will be so many in number that they would form a voluminous pharmacopœia. Then again, considering the temperature of the country and its seasonal variations, certain material alterations in spirit strength and alkaloidal contents should be made for B.P. drugs to be used in India. A large quantity of imported drugs degenerate in this country on account of indifference to this point.

The question of giving protection to indigenous drugs and medical articles is a very important one. But this question should be better discussed before a committee with technical knowledge of tariff. The present committee should appreciate the fact that if a trade in its infancy is obliged to compete with an old and well organized trade the former would undoubtedly suffer. Therefore not only should internal taxation be reduced to minimum but such protective duties should be imposed upon competitive foreign articles for a length of time so that the infant in India may grow up.

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Although indigenous raw materials for drug manufacture are available in India, there are no reliable dealers with expert knowledge for such articles. Generally, indigenous drugs are supplied by small private collectors, who personally, or through their agents, collect the drugs from the forests, and offer them for sale at the provincial towns. A manufacturer invariably finds it difficult to obtain a large quantity of a seasonal produce of any drug in India, because there is not a central Indian market for same. He also finds it difficult to depend upon the potency of a drug even when the supplies come from an authoritative source. We can cite numerous instances on this point. Digitalis supplied by the Government plantation of Mungpoo and sometimes by the Forest Department of the Kashmir State proved physiologically inactive after extraction. The reason for such changeful quality of crude drugs is, in our opinion, that drug cultivation is not done with care and prudence in India.

We have no information as to any plantation of indigenous drugs carried on on the right lines by any expert body. The result is that the strength and potency of the drugs vary considerably, and no manufacturer in India can depend upon any supplier for obtaining the right and uniform quality of drugs.

The Indian manufacturer has a very legitimate grievance against the Excise laws of the country. It will be evident from our remarks that a standard quality of drugs is not always obtainable in the Indian market, and every time a lot is purchased the alkaloidal and glucosidal contents of some as well as the biological potency in certain cases should be tested out before extraction on a manufacturing scale is made from a drug. Such tests necessitate the use of spirit outside the bond which very often has to be discarded on account of the poor quality of the extract. In such cases the manufacturer, unless he is provided with a supply of spirit at duty-free rates for such test purposes, is put to a great loss for having to throw away the bad extract made with spirit purchased by paying full excise duty. There is no provision in the Excise laws of India to help the manufacturer on this point. There is only a provision that, if a certain extract turns out to be biologically unfit, the Excise Department allows the manufacturer to recover the spirit by redistillation. Such provision is not very helpful, because the manufacturer has to waste his time and money in recovering the spirit from an unfit tincture the making of which could have been prevented if proper facilities were offered by the Excise laws.

Then again, the indifference of the Excise Department to assay the alkaloidal and glucosidal contents of an extract, compels even the scrupulous manufacturer to overlook all defects in these points in his products, and issue all extracts without any standardization of their glucosidal and alkaloidal value. What else could be expected of the manufacturer? If he finds that an extract is deficient in these two points, he is willing to improve the same, but, the Excise Department will not allow him to discard the deficient extract and recover the spirit out of it by redistillation. The result is that most of the tinctures manufactured in India could not be relied upon as to their glucosidal and alkaloidal worth.

We should not lose sight of another aspect of this question arising out of the want of control of the Government over the quality of extracts sold every day in the Indian markets. This is the difficulty of a genuine manufacturer in trying to sell the best standardized tincture or extract against the competition of persons selling spurious articles, the prices of which have been cheapened by adulteration of quality. Is it not a fact that in India any person educated or uneducated is at liberty to sell any coloured spirituous preparation in the market as good tincture? The laws do not prevent him. Naturally an honest manufacturer does not get his price for his good preparations because he has to compete with the adulterated pharmaceuticals.

The manufacturer of indigenous drugs has very little to do with the Customs Department. But there is one thing which should not be ignored in this connexion, viz., the importation of crude drugs or solid extracts of inferior quality. If the importation of inferior drugs be not stopped, then the non-bonded manufacturer puts such articles to use and makes inferior preparations with which the bonded manufacturers have to compete.

The bonded manufacturer has unfortunately to fight with other factors which can be easily controlled by the Government, viz., the freedom to sell anything as B.P. preparations by anybody in the market. We understand that there is a law in the Statute Book to control such sale and that summary powers have been given to the Surgeon-General to stop such sales. But neither the law is enforced nor the Surgeon-General exercises his authority, and, to-day any man without any chemist's qualification, even without any education, can open a chemist shop and sell any coloured liquid as B.P. tincture. The monstrosity of such position is never realized by the authorities who enforce all their strict laws only on the bonders who are under their control.

A regular bonder has also to meet the price-cutting competition of the so-called manufacturers of B.P. preparations, who are allowed by the Excise Department a certain quantity of spirit at reduced duty rates. While in some cases the necessity of offering spirit at reduced duty rates is justifiable, it should be discouraged in the case of tincture manufacture. The tincture manufacturers who get spirit cheap generally buy B.P. tinctures in bulk from bonders and repack them after diluting the preparations and reducing their quality simply to compete with the bonders by cutting the price of B.P. preparations. Instances may be cited in which a B.P. preparation is offered in the market at a price at which a bonder cannot even produce it in his laboratory.

The policy of the Government to realize all the inspection charges from the bonder is unjustifiable. Such policy imposes a handicap, because the Excise charges have to be added to the cost of production. The Government realize the Excise duty from a bonder, and thereby ensure a standing revenue from a genuine business firm. But the Government do not consider how the Government revenue is defrauded by persons who dilute the tinctures and sell inferior preparations and thereby prevent the sale of good B.P. tinctures with full spirit contents.

(18)

By Colonel B. Higham, I.M.S., Chemical Analyser to Government, Central Laboratory, Byculla, Bombay

My experience of the strength and purity of drugs is derived from the analysis of samples of drugs sent to me by the Collector of Customs either (1) for the determination of the percentage of alcohol present in them with a view to the levying of duty or (2) under the Merchandise Marks Act for determining the correctness of their description. Up till March 1929 I was the official analyst to the Collector of Customs. The British Pharmacopœia does not lay down the proportions of alcohol in finished products but it does of course, define the amount of alcohol to be used in the process of manufacture. During the course of these processes some alcohol may be lost by evaporation and this loss may be very considerable when prolonged filtrations have to be done. However, experience soon shows for each preparation about how much alcohol may be expected in the finished products. In or about the year 1921 facilities were given for the manufacture in bond of medicinal tinctures by Indian manufacturers and I began to get such tinctures for analysis for the levying of excise duty. Either because the existence of these locally-made tinctures had lowered the price in India or for some other reason it began to be noticed about this time that some imported tinctures were containing less alcohol than before and were thus apparently not strictly what they purported to be, i.e., B.P. This, did not of course apply alike to all manufacturing firms. Some maintained the old strength unchanged and others made two grades one labelled B.P. and remaining strictly B.P. and the other with the letters B.P. omitted and with the alcohol deficient. Others however retained the description B.P. and yet diminished the alcohol content. A patent example of this tendency was syrup of orange. If this is prepared according to the directions contained in the B.P. it must contain approximately 17 per cent proof spirit and prior to 1921 the imported samples used to contain this amount. Subsequently however it became a common occurrence for samples to be received that were entirely free from alcohol. Another glaring example was aromatic sulphuric acid. If this is prepared correctly it will contain about 140 per cent proof spirit. Samples have been received containing as little as 18 per cent. The same tendency but not to such an extreme degree was also observed in the tinctures of aconite, arnica, orange, buchu, camphor (Co.), capsicum, cardamoms (Co.), etc. This is not perhaps a very important matter and some people might prefer a preparation containing no alcohol but in certain circumstances it might acquire a greater significance. For example when making up a prescription a second time it is very desirable that the ingredients used shall be of the same constitution, for, otherwise, the resulting mixture may be very different in appearance, taste, etc. The solubilities of the other drugs used in the prescription may also be affected. Where the B.P. actually lays down the strength of the finished product as for example in acidus hydrocyanicus dilutus, which should contain 2 per cent of the pure acid, it is of course essential that this proportion should be actually present but even in other cases it is desirable that the proportions of each constituent shall not vary to any great extent. A preparation marked B.P. should actually be B.P. The cases in which I was asked to analyse drugs under the Merchandise Marks Act were more important. In 1928, I was sent several samples of quinine tablets and the amounts of quinine present were found to be very much less than those shown on the labels. Five grain tablets contained only 2½ grains and 2-grain tablets anything between 0·5 and 1·25 and 1-grain tablets about 0·3-grains. I regarded this as so important that I addressed the Surgeon-General in the matter and suggested that an *ad interim* Quinine Act should be introduced in the legislature pending the introduction of the General Drugs Act that I considered must eventually be required. Another point of importance that arose was the constitution of Dover's powder. This should contain 10 per cent of

opium and the word 'compositus' is used in its official designation of Pulvis Ipecacuanhæ Compositus solely on account of the presence of this opium in its reconstruction, the other ingredient, sulphate of potash, being merely present as a mechanical adjuvant. Yet, I have had samples that contained no opium although labelled Pulv. Ipecac. Co. and others labelled Pulv. Ipecac. Co. with the words 'without narcotic' in much smaller type. The existence of such preparations is definitely misleading and should not be permitted.

It would probably be difficult to standardize any of the indigenous drugs in the sense that, e.g., tincture of opium is standardized, for the reason that at present the constitution of these drugs is unknown in many instances and in others there are no known chemical reactions by which they could be standardized. It would, however, be possible to start the compilation of a pharmacopœia nevertheless. The majority of the preparations contained in the British Pharmacopœia are not standardized in the sense that opium is standardized. It would presumably be possible to lay down standards for the raw materials, giving for medicinal plants the descriptions of the parts of each plant to be used and the age of the plant to be selected when these were important, and the means of detecting the common adulterants and the same could be done for minerals and drugs of animal origin. I know very little about indigenous drugs but I imagine that such details could be compiled in the course of time. Then for preparations of these raw drugs it would be possible, surely, to give the proportions of each ingredient and details of the processes to be adopted in preparing them. Then experience would be gained as time went on regarding the physical properties of the various preparations, e.g., their colour, consistence, total solid constituents, etc., by which it could be verified at any rate to a rough extent if they had been made in accordance with the directions laid down. It would be a lengthy business perhaps but which of it must already be known and, at any rate, a beginning should be made.

(19)

By Mr. P. Neogi, Ph.D., I.E.S., Professor of Chemistry, Presidency College, Calcutta

Control of drugs of British Pharmacopœia.—As questions of life and death are involved, standardization of drugs is to be effected whenever quantitative tests can be applied. So far as drugs incorporated in the British Pharmacopœia are concerned, some measure of state control is obviously desirable with a view to prevent adulteration. A 'Food and Drugs Bill' was drafted by the School of Chemical Technology of which Mr. J. C. Ghosh was the Principal. It was adopted by the Executive Council of the school of which I was a member. The provisions of that draft might be adopted as a basis for legislation. Mr. Ghosh once thought of having the Bill passed through one of the legislatures through some member.

So far as analysis is concerned, the work might be entrusted to the Calcutta Test House or to laboratories maintained by the industrial departments of local Governments. Enquiries might also be made if the laboratories of the Customs Department might not undertake the work. Some expansion in the laboratories would of course be necessary in each case, but the expense of building a new and separate central laboratory would thereby be avoided.

Several firms in India manufacture some drugs incorporated in the British Pharmacopœia. The reputation of these firms, such as Bengal Chemical and Pharmaceutical Works, Messrs. Bathgate & Co., and others, for honesty in medical preparations stands high, but, with a view to prevent unscrupulous people from attempting to foist adulterated drugs of their own manufacture on the unsuspecting public, batches of preparations of each firm should periodically be examined in the Government Testing Laboratories mentioned above and certified as having been correctly prepared. Such control should, however, be judiciously exercised, and care should be taken to ensure that legitimate industry does not suffer. As the knowledge of science spreads and industrial progress is activated, more and more drugs of the British Pharmacopœia would be manufactured in India. State control should be so judiciously exercised as to ensure purity of medicinal preparations but at the same time continued activation of industrial progress. Similar analytical control should be exercised on imported articles as well.

So far as raw products are concerned, it would be very difficult to exercise any control. Pure chemicals are imported from reputed firms, but vegetable raw products are generally obtained from the bazaars. It would be impossible to lay down any standard for these bazaar products. The firms manufacturing drugs from these products should have their own reliable suppliers or might cultivate these vegetable raw drugs in their own gardens.

The work of inspection of firms importing or manufacturing medicinal preparations might be entrusted to the Industrial Chemist of the Industries Departments of Local Governments. He would inspect these firms and send samples to the testing laboratories for analysis. A separate officer for this purpose would have ultimately to be appointed in the future.

Indigenous drugs.—The largest users of indigenous drugs for manufacturing purposes are the kabirajis and the hakeems. The total annual value of these drugs would be many lakhs so far as the whole of India is concerned. Most of these kabirajis, whose number would be several thousands, prepare their own medicines, and their main income is derived from the sale of these medicines. They follow the directions given in the Ayurvedic treatises for the preparation of these medicines. Charaka and Shushruta, two ancient standard Ayurvedic treatises, mention about seven hundred medicinal herbs. Metallic medicines came to be used more frequently from the 12th century and later. At present some two hundred and fifty vegetable herbs and about thirty or forty mineral substances including preparations of mercury, arsenic, gold, silver, copper, tin, iron, zinc, bronze, brass, sulphur and borax are used. Most of these metallic substances are insoluble. For instance, the commonest mercurial preparation used internally is the black and red varieties of mercuric sulphide (makaradwaja) which is insoluble in all single mineral acids. The commonest iron preparation used is ferric oxide obtained by roasting iron hundred and even one thousand times. Tin is used as stannic sulphide (mosaic gold), arsenic as the sulphide and gold as the finally powdered metal.

As regards herbs, extracts and powders are generally evaporated to dryness and administered in the form of pills. Extracts in oils and clarified butter are also used. Individual preparations often contain twenty and even forty or more herbs and metallic medicines boiled or powdered together. With a view to make these easy for patients to swallow, these are powdered with honey and mixed with freshly extracted juices or raw herbs.

So far as standardization is concerned, it would be a hopeless affair. As dozens of herbs and metallic substances are compounded together in one and the same medicine, no standard can evidently be laid down for compliance. No two samples of the same medicine would agree in composition, specially as ill-qualified and ignorant people often pass as kabirajis and prepare their own medicines. Most of these people are unable even to identify the plants and substitutes are frequently used.

As regards metallic medicines, I would be glad if some control can be effectively exercised by way of standardization. For some years I was engaged in the analysis of the metallic preparations used by the kabirajis. The results have been incorporated in a paper published in the Journal of the Asiatic Society of Bengal (iron only) and in a separate book entitled 'Ayurveda and Modern Chemistry' written in Bengalee. During my work I used to purchase these metallic medicines from different kabiraji shops of Calcutta. I was disgusted to find that no two samples agreed even in their colour. One and the same substance would be black, grey, blue and even white. These metallic preparations such as purified arsenic, copper sulphate, gold, tin, brass, bronze and pearls are extensively used as ingredients of numerous standard Ayurvedic medicines. Analysis showed that samples of ferric oxide prepared by roasting iron thousand times contained 30 per cent silica owing to the fact that the pounding of the iron was effected on stone plates. Many of these preparations, as white and yellow arsenic and copper sulphate, are poisonous. I would be glad if any control can be exercised in the standardization of at least these metallic ingredients. I would suggest that a Board of eminent kabirajis, chemists and medical graduates be formed with a view to determine to what extent control as regards standardization can be effected. At present kabiraji education has been largely modernized, and at Calcutta itself three large colleges have been established with a view to impart kabiraji education in combination with the knowledge of Western sciences. I have visited one of these and was satisfied that a large amount of knowledge of modern sciences is being

imparted to these students. Kabirajis possessing medical degrees are now increasing in number. The proposed Board should contain the names of some of these kabirajis who are trained in modern sciences as well. I am sure the proposed Board would be able to evolve out some method of standardization of these metallic ingredients or Ayurvedic medicines.

Besides the kabirajis who deal with indigenous medicines, another class of people has arisen within the last quarter of a century who are manufacturing tinctures and extracts of individual indigenous drugs and selling them as extract of gulancha, extract of punarnava, extracts of bael, kurchi, kalmegh, ashoke, aswagandha, anantamula, etc. These are mostly aqueous extracts of well-reputed individual Ayurvedic drugs. These were first manufactured by the Bengal Chemical and Pharmaceutical Works and are now largely prescribed by Indian medical practitioners. I do not know if any clinical examination of their medicinal efficacy has at all been undertaken, but the reputation of these herbs as curative agents is a long-standing one, and the manufacturers have evidently based the curative virtues of these preparations on the reputation they possess in the country as medicinal herbs.

Seeing that the preparations of the original makers of these drugs command a large sale amongst the general public as well as in the medical profession, other firms have also commenced manufacturing these drugs. It is impossible in the absence of quantitative estimation of the active principle of each drug, to prescribe conditions of standardization. Much chemical and clinical work is necessary before any practical step could be taken in this direction: Good work is being done in the isolation of active principles of these drugs in the Calcutta School for Tropical Medicine and by some individual chemists. But much more remains to be done before standard tests could be laid down for standardization of these drugs which is certainly desirable. It is to be noted that the work of preparing these extracts and tinctures has not only its scientific importance but also great economic value as well. Leaving aside the seven hundred plants mentioned by Charaka and Shushruta, even if the two hundred and fifty individual drugs could be identified and extracted of their principles, a large and profitable industry would be built up, whilst the net gain to medicine and chemistry would be enormous. It is to be borne in mind that the recent thereapeutic agents for curing leprosy were extracted from the Indian chaulmoogra oil. Ignorance and prejudice on the subject, even in enlightened quarters, are enormous. Some years ago I found an announcement of prizes for clinical work on 'Makaradwaja' in the Calcutta Gazette over the signature of the Principal of the Calcutta Medical College in which this well-known Ayurvedic medicine was described as a plant, whilst actually it was a metallic substance. The work now being done at the Calcutta School for Tropical Medicine is fast removing prejudices in the matter, and reputed chemists are now taking to this line of exploration in the Indian Universities.

Proprietary medicines.—If the analyses (published in a book I read some years ago but the name of which I am forgetting) are to be believed most of the well-known proprietary medicines sold in the market should be banished from circulation. Yet the Indian market has been flooded with these proprietary (or better known as 'patent') medicines, and their number is increasing every year in an alarming degree. Indians themselves are now manufacturing these patent medicines and throwing them on the Indian market. Advertisement in glowing terms in newspapers, pamphlets and calendars is the principal method by means of which these medicines find their way to the homes of the lay public which is gullible enough to swallow these high sounding, but in most cases false and self-manufactured encomiums.

Some of these 'patent' medicines, the ingredients of which are well known, are quite good. Yet there are many others, the composition of which has been kept secret. I am of opinion that secret remedies should be banned. The approximate composition of each patent medicine must be disclosed to the public. A legislation should be passed requiring manufacturers of patent medicines to disclose on the labels of the phials containing those medicines their approximate composition. This will banish all illegitimate preparations from the market. Control on these medicines might be established by subsequent analysis.

Biological products.—So far as sera, vaccines and organo-therapeutic products are concerned it is notorious that these deteriorate on keeping

specially in tropical climates like ours. Many vaccines and sera are now being manufactured in India also. Organo-therapeutic products are still mostly imported from abroad. The Test Laboratories mentioned above should possess a biological department also for testing the purity and efficacy of these biological products.

As regards the question as to whether only qualified persons would be permitted to open pharmacy concerns, I am of opinion that no such qualifications should be laid down for two reasons. In the first place it would be very difficult to prescribe minimum qualifications and in the second place these might be misconstrued as tending to interfere with legitimate trade interests.

(20)

By Captain G. Srinivasamurthi, Messrs. N. Madhava Menon, Murugesa Mudaliar and Sankunni Menon, Representatives of the School of Indian Medicine, Madras

I am concerned at present with medicines and medicinal preparations of Indian medicine, prepared and used in accordance with the teachings of Indian medicine; and have no personal knowledge of either the recently introduced preparations, prepared on Allopathic pharmaceutical lines or of the even more recent preparations (e.g., makaradwaja) manufactured in Europe and put on the Indian market as genuine preparations made according to directions given in Indian Pharmaceutical works or by practitioners of Indian medicine.

That standardization is desirable and necessary needs no arguing. The only question is whether we have the necessary data. The answer is that we have not got them at present but must get at them by investigation and research. The general lines of such research and the details for Madras conditions are dealt with at length in the Memorandum on 'Research in Indian Medicine with special reference to present-day conditions in Madras' already sent to the Committee of which the following is an abstract:—

Research in Indian medicine is now confined mainly to Pharmacological Research on lines started at the Calcutta Tropical School: the underlying notion is that Indian medicine is valuable only in its materia medica—medicines and recipes—and not also in its physiology, pathology and principles of diagnosis and treatment because it is based on *thridosha* theory which is dismissed away as the exploded 'humoral' theory. This is a mistake and has limited and hampered research besides resulting in the extraordinary phenomenon of the art being required to be investigated by persons who have no proper appreciation or knowledge of the principles of the science on which practices of the art are based. The order of importance, judged from the standpoint of most promising results, is the following:—

(1) First and immediate, *clinical research* into the value of medicinal, dietetic and other treatments, advocated in Indian medicine.

(2) Next, *pharmacological research* based on data of clinical research.

(3) Next, *standardization* based on data of previous researches.

The *environment* best suited for this purpose is that of teaching hospitals with facilities for hearty co-operation between practitioners of Indian and Western medicine as also between clinical and laboratory workers. *The investigators* best fitted for this work are competent general practitioners. Clinical research is, in fact, the speciality of the general practitioner.

There is one line of investigation which may prove specially helpful if the workers at the Calcutta Tropical School and other such institutes would adopt it; and it is this. In ancient times, Indian physicians seem to have been their own collectors of herbs, making their collections at proper seasons from neighbouring forests, just as they were their own chemists and dispensers. Under modern conditions, however, it frequently happens that raw herbs and drugs are brought from bazaar supplies, which are not always of excellent or even good quality. It is true that physicians specially experienced in this line can distinguish the good from the bad and grade the good samples in their order of excellence. But, if modern research could reveal to us the specific physical and chemical features of those samples

which are selected by experts of Indian medicine as the best ones from the standpoint of Therapeutics, then, we may have a comparatively easy method of standardizing the crude drugs commonly included among our bazaar supplies.

(21)

By Dr. V. Rama Kamath, Editor, "The Medical Practitioner," Member, Madras Medical Council, Madras

The pursuasive language used in advertising proprietary medicines with secret formulæ and the false guarantees given in such advertisements, which has been copied from the West, attract the people in this country who have a highly credulous temperament. The existence of various systems of medicine in addition to the Allopathic without legislative control by Government on quackery has been naturally increasing the number of quacks who use all sorts of devices to attract the public in the matter of the sales of their proprietary medicines. Many of these preparations are for venereal diseases and sexual impotency, and I will not be far wrong when I say that the educated more than the uneducated in the Indian society fall an easy prey to these secret formulæ, and so long as the word 'secret' remains in the dictionary, any amount of control is sure to bring about more and more secret formulæ in the most secret way. The only solution to put an end to secret devices is to entrust the work of educating the public to qualified medical profession. It is their legitimate duty to combat the evils of secrecy in the treatment of human ills, but unfortunately the medical profession in our country, I mean the only one system recognized by the Government to be scientific, is to-day most disorganized on account of two distinct groups now existing, the Government-paid practitioners and the private practitioners, amongst whom there exists to-day most unequal and unwholesome competition with the result that both the groups are not devoting as much attention as they ought to, as members of a noble profession, in doing propaganda against quackery. On the other hand, unhealthy rivalry in the matter of private practice has unfortunately been the cause of even qualified members of the profession to go out of the way in their struggle for existence, and the best way of controlling the sale of medicines with secret formulæ is to encourage the growth of the independent medical profession and have recourse to legislation to put an end to quackery and to entrust the profession wholly with the responsibility of medical relief on the curative side and the Government running only the department of medical relief on the preventive side; and even in systems other than Allopathic it must be made compulsory that nobody should be allowed to treat human ills unless he gets licence from the Government. This has been made possible in some places in India, such as Goa under the Portuguese Government where nobody practising in indigenous systems of medicines could do the same unless he obtains a licence from the Government.

Unless those who deal in or with drugs have sufficient knowledge and training to find out scientifically the purity of drugs, it will not be possible for this class of people to appreciate, much less to find out, pure drugs. The very fact that the Drugs Enquiry Committee is presided over by an eminent person in the medical profession proves the importance and necessity of imparting sufficient knowledge in analytic chemistry and pharmacology to medical students in the teaching institutions, more elaborately than it is done to-day. The fact that unemployment of a large number of medical men, who to-day feel nervous to earn their livelihood by independent means on account of their inability to compete with the State-paid practitioners and who are forced to earn their livelihood as dispensers, is another factor to be taken note of. On account of a large section of medical men taking to the profession of dispensing, the professional chemist is fast disappearing, and the medical professional is drifted to the earlier primitive stage when the doctor, the chemist and the dispenser were all combined in one person. The present day chemist came into existence as a different entity more for the purpose of division of labour, so that the superior brain of the doctor could be utilized for a higher purpose, i.e., in the matter of diagnosis and treatment of diseases. As the state of affairs as mentioned above have come to such a pitch that the professional doctor finds little or no work in his special sphere, and has to take to the profession of the chemist and the dispenser, it is highly desirable that special care should be taken in imparting training to the medical students while at college or schools so that they may be efficient chemists and druggists in future life.

(22)

By Major G. C. Maitra, I.M.S., Punjab

(*a*) *Standard preparations.*—A certain amount of routine work for testing the toxicity of salvarsan preparations is done at this institute for the Army Medical Department. All these preparations are imported from abroad. Usually only samples suspected of deterioration on account of storage under Indian conditions are submitted to test. In the last 18 months, 39 samples of Sulfarsenol and 3 of Neosalvarsan were tested. About 40 per cent of the former and 100 per cent of the latter were found to have become toxic on injection into the experimental animal—a specially bred strain of English white mice.

In the army, all samples adversely reported upon are withdrawn from circulation and destroyed. But there is no such control in civil practice although salvarsan group of drugs are used extensively by medical practitioners both private and public.

(*b*) Various proprietary preparations mostly of the nature of snake bite cures have been received at this institute for testing as to their alleged infallibility in cases of snake bite and rabies. Two of them are patented in India and are worth mentioning. Both of these were tested in vivo on pigeons and were found to have no life saving effects whatsoever in experimental cobra venom poisoning. Nevertheless very extravagant claims are made in advertisements and I am tempted to quote a few lines from the printed booklet which accompanied samples of one. The author and inventor of the remedy writes under the caption 'Conquest of death'—"In case the medicine has reached the patient too late and he has breathed his last, he may be revived if made to inhale this remedy within three hours of death by artificial respiration."

In the case of the other, the manufacturer claims 'it works as miracle in cases of snake bite and rabies.'

Various curative sera, vaccines, gland extracts, hormones, etc., locally made as well as imported are sold in India. The way in which the manufacturers undersell these products raises serious doubt as to their effectiveness. But this is a mere suspicion and we have no data to substantiate it. We had however occasions to test one brand of imported anti-venomous serum commonly known as 'Fitzsimons's anti-venomous serum.' Samples of the above were tested twice at this Institute, once in 1924 and again towards the end of 1929. On both occasions the serum was found of poor quality and certainly not effective against the bites of 'all snakes of Asia' as claimed by the maker. Under identical experimental conditions the serum had only one-sixth the capacity of neutralizing cobra venom of the Kasauli anti-venin.

(23)

By Dr. Sundari Mohan Das, Calcutta

I have the honour to acknowledge the receipt of your letter, dated the 2nd September 1930. In reply to your statement that there is a suspicion about the ulterior motive of the Government, I beg to submit that the apprehension is quite natural for various reasons. In the first place, no effort has hitherto been made by the Government to help the drug industry in this country. In the second place, although the Council of State had resolved so far back as 1927 to appoint a Committee like yours, no attempt was made to give effect to the Resolution within these three years. The recent proposal to standardize drugs, coming, as it does, so soon after the starting of the British drugs boycott movement, naturally creates an apprehension that the ulterior motive is to brand the indigenous products as inferior in quality and thus to stifle the drugs industry that is growing in the country. The apprehension is further aggravated by the fact that the Government are moving at a time when the attention of the thinking population is diverted to momentous issues and legislation is bound to be hazardous as the legislatures are deprived of representative persons engaged and confined elsewhere. The suspicion gathers strength on account of the

fact that, in spite of the financial crisis on account of which aid to the nation building departments has been crippled, the Government have undertaken a task which involves a great deal of expenditure for the commission as well as for the starting of test laboratories. The composition of the Committee also lends colour to the suspicion, the only representative of drug firms selected being an importer of British drugs.

Another suspicion looms large in the horizon. It alleges that the object of the Government is to put out of market foreign drugs other than British. This, if true, would be disastrous, as the former are cheaper, and cheapness in a poor country like India counts much. Out of drugs and chemicals imported from foreign countries annually and valued at 4½ crores of rupees, 1¾ crores worth only are imported from the United Kingdom while the remainder is imported from other foreign countries.

Under the circumstances, I am of opinion that the time is quite inopportune for an enquiry or a legislation on the lines proposed. I would venture to suggest that the matter be taken up after the state of things in the country returns to normal, the already existing municipal laws be enforced and the Municipal Acts be amended so as to meet the ends of prevention of adulteration of drugs.

I may here mention that, while I was a member of the Calcutta Corporation Public Health Committee, the corporation, at the initiation of that Committee, passed a resolution to the effect that according to section 3, sub-section 2 of the Preliminary of the Municipal Act, a drug would be deemed adulterated if it differed from the standard of strength, quality or purity laid down in the British, German, American or any other pharmacopœia, or if its standard fell below the professed standard under which it was sold or exposed for sale. Druggists would be prosecuted if the name of the manufacturers and the strength of the ingredients were not found written on the label of each bottle, box or receptacle.

As far as Calcutta is concerned, test centres may be started at the Tropical Medical School and the Corporation Laboratory.

(24)

By Dr. A. Lakshmanaswami Mudaliar, B.A., M.D., Second Obstetric Physician, Government Hospital for Women and Children, Madras

1. (1) *Sale of drugs of defective strength and impure quality.*—The extent to which drugs of impure quality or defective strength are sold in the market in British India cannot possibly be ascertained under the present circumstances. In the absence of any standards and methods fixed for testing the purity of such drugs, it is obvious that many cases will escape notice which would otherwise be brought to the attention of the authorities concerned. The difficulties in the way of getting drugs examined with a view to test their purity by medical practitioners are many. However, it may be stated from clinical experience of the therapeutic value of certain well-known drugs, that at present the market is flooded with a large number of preparations of inferior quality and doubtful purity, which must necessarily be deleterious to the patients. There are certain preparations, such as Extract Ergot Liquidum, preparations of Digitalis and certain preparations of Quinine, which have been found defective from clinical experience. Even in regard to well-known British Pharmacopial preparations, the clinical results of drugs obtained from different firms, vary. It is also a fact that there are certain drugs sold in the market at rates which are so widely different that it is but reasonable to infer that the cheaper drugs are probably of doubtful quality.

It may, in this connexion, be mentioned that from time to time, either the Officer-in-charge of the Government Medical Stores Depot, or the Director-General, Indian Medical Service, have issued instructions through the respective heads of departments, to all Government medical institutions to suspend the use of certain drugs that have been supplied to them. In particular, such circulars have been issued as regards the different preparations of Neo-Salvarsan, samples of chloroform and either. These preparations are from well-known manufacturers, and yet some of

them have been found to be either defective in strength, or harmful in quality, and therefore instructions have had to be issued. One is naturally tempted to ask what will be the position as regards the non-Government institutions and private concerns which must have bought these same preparations. Cases are also not infrequent where firms of doubtful reputation have palmed off drugs of questionable quality in a form that would likely be mistaken for a supply from a reputable firm. Not long ago, the representatives of the well-known firm of Bayer Meister Lucius have had to bring to the notice of the Government the fact of such a fraudulent business transaction and the necessity for strict care being taken to verify whether the drug came from the genuine company or not.

Within the last four or five years, a large number of firms have deluged the market with preparations of such a questionable character that, at present, it seems to be a serious problem for one to make himself sure that the drugs are of the best quality and quite pure. A medical practitioner can ony prescribe, and it is left to the patient to get the prescription compounded in the usual way at a chemists and druggists shop. The control therefore is lost, when cheaply quoted drugs are allowed to be sold to these firms, and while the prescription may be compounded accurately enough by the particular chemist and druggist, the drugs used therein may be of very inferior quality.

Another evil that has grown within the last four or five years is the number of patent medicines and the secret formulæ remedies that have been allowed to flood the Indian market. At present, by every Mail, one is flooded with an amount of literature, which, at best, can be said to be a sample of good advertisement. Besides, a large number of representatives of these firms are now going about explaining the virtues of these drugs to practitioners in such a way that one is tempted to try some of these drugs, about whose purity and efficacy, serious doubts must exist. The evil of this advertising tendency has grown so much that it has spread to the general public; and it is not infrequent for patients to believe so implicity in the potency of patent medicines as to be importunate in their demands with the medical practitioners concerned.

(2) *The biological products.*—The above remarks may hold good so far as biological products are concerned. A large number of firms, particularly continental and American, are now inundating the market with various glandular preparations. My own clinical experience is that the majority of them have little or no effect. It is only the products of certain well-known firms that give satisfactory results when tested clinically.

(3) *Sera and vaccines.*—The craze for treatment with sera and vaccines is on the increase, and while undoubtedly there are cases where much benefit will result from such treatment, at present a much larger number of cases are tried with these remedies. These sera and vaccines are, in the first instance, not all of them of the standard strength and potency. The other evil, however, is that firms are allowed to stock these sera and vaccines and to sell them without any effective methods of proper storage.

(4) *The necessity in the public interests of some legislation to control the potency and purity of drugs.*—From the above, it is obvious that the necessity for some control is self-evident. It has been stated that in recent years a much larger number of firms of doubtful standing are trying to capture the Indian market and are flooding the market with cheap preparations, some of them marked 'special,' and the absence of any control has been the greatest incentive for such firms of doubtful reputation to take advantage of the situation and to import drugs of inferior quality. The danger to the public, both positive and negative, needs no exaggeration. So far as the drugs are concerned, it should be stated that if the public buy the cheaper drugs, it is because they assume that the quality and the potency of the drugs are by no means inferior. It is unfortunate that the medical profession itself is, in the absence of any certification, unable to judge whether these drugs have come up to the standard of quality. Legislation is now existent for the control of what are known as the dangerous drugs, and under powers vested under the Act No. II of 1930—"The Dangerous Drugs Act"—the Government have ample powers to control the manufacture of such drugs, the internal traffic and dealings in such drugs, and on the particular firms which sell these drugs. The extension of legislation on somewhat similar lines to cover the cases under question will not therefore be an innovation.

For an effective working of the machinery needed for such legislation, it may be necessary to have Provincial Boards of control in the different provinces and a Central Board working under the Government of India. The Provincial Board may include—

(1) the Chemical Examiner to the Government,
(2) a Professor of Pharmacology,
(3) a Professor of Therapeutics,
(4) the Officer-in-charge, Government Medical Store Depot, and
(5) a representative of the Pharmaceutical Society. The Central Board of the Government of India may be similarly constituted, and should have the right to adjudicate on an appeal from the Provincial Board. All drugs imported or manufactured locally, must be subject to test with a view to see to their efficacy and standardization by the Provincial Board.

The import of drugs at present is in the hands of those who are ill-equipped with the knowledge necessary to satisfy themselves about the purity of these drugs and when licences are granted for drug houses, care should be taken to see that such stores have a trained person to advise them in the matter. Although there is a "Poisons Act" the Act of 1919—which regulates the importation, possession and sale of poisons throughout British India, the provisions of this Act are not sufficient to cover the many cases where persons may be in possession of drugs as potent as any of the poisons that can be brought under the Poisons Act. To leave the control of such dangerous drugs in the hands of illiterate people, or of those with little or no idea of their deadly effects, seems to be an anomaly; and the question of licensing the firms dealing with such drugs and the conditions under which such licences should be granted, seem to require the most careful consideration.

It has been stated above that legislation with a view to control the importation and manufacture of drugs of impure quality or defective strength should be undertaken. One effect of this, however, will be the restricting of such importation to a few well-known firms, and consequently, it may lead to a rise in the price of drugs and to the creation of a monopoly. Any increase in the price of drugs will adversely affect the large number of persons now seeking treatment under the allopathic system. One may even say that one of the chief factors militating against the spread of the allopathic system of medicine is the almost prohibitive cost of the medicines, so far as the large masses are concerned, who are unable to resort to the free medical aid given at Government institutions. The reason why such a large number of Continental and American firms, besides well-known British firms, now seek to import their products into the Indian market, is because the market is unprotected and offers no competition whatsoever. The only remedy for such a state of things is State protection and State subsidy with a view to develop a local drug industry in the country. The provisions of the State Aid to Industries Act passed by the Local Government could well be applied to encourage the formation of commercial indigenous concerns with a view to prevent monopoly and cut down the prices. Although this may not come strictly within the terms of reference of this Committee, I feel that it has an important bearing on the question of legislation. In a country which offers every variety of climate and all conditions necessary for the growth of the different preparations needed, there should be no difficulty for a State Aided indigenous drug industry to develop which will be controlled and fostered in its initial stages, so that it may command the confidence of the public and may lighten the cost of medicines very materially to the benefit of the large masses.

(5) *Proprietary remedies particularly those with secret formulæ.*—The flooding of the market with proprietary remedies is a grave menace to the general public. These remedies are, in the large majority of cases, advertised with such flagrant disregard to their real intrinsic value, that it has led to the patients resorting to them without any advice from medical practitioners. There should be a strict ban on all proprietary remedies with secret formulæ, and in cases where proprietary remedies are offered for sale with bellicose advertisements, there would be some machinery like the Committee of the British Medical Association, which sits to investigate many of these remedies and gives an authorized opinion of their value. This would help very materially the practitioners in making a wise selection of such proprietary remedies and will go far to check the evil of indiscriminate advertising.

(6) *The necessity of legislation to restrict the profession of pharmacy to duly qualified persons and to make recommendations.*—At present, in this Presidency there are a class of persons called chemists and druggists, who are trained at the Madras Medical College, and who attain a high standard of proficiency in pharmacy. Although this class has been in existence for a large number of years, it has not attracted many candidates, for the obvious reason that the openings have been few and that those who have passed out have not met with any encouragement either from the Government or from private concerns. There is another class of persons called compounders, who are trained by the Local Government and this class receives only an elementary instruction in pharmacy and it cannot be said that they come up to the standard required. Of late, the training centres for compounders have been increased and it is now practically in all district-headquarters hospitals, the training being given largely in such institutions and examinations being conducted under the rules of the Government Technical Examinations by the District Medical Officers. I venture to think this has resulted in a lowering of the standards and the institutions, where such training is now imparted, are not fully equipped for the proper training of these compounders, even to the minimum standards; nor does it seem to be correct to state that the examinations may be conducted by District Medical Officers, whatever their aptitude or knowledge of the details of pharmacy may be. The training therefore requires considerable improvement; the number of centres may, with profit, be restricted and better equipped, and the persons specially qualified to give the training may be empowered to do so. It is also desirable that the examinations should be conducted by a Board of qualified persons who have specialized in Pharmaceutical Science. The need, however, is for the encouragement of the better class—the Chemists and Druggists—who correspond roughly to the Members of the Pharmaceutical Society of Great Britain. These persons should be appointed in all large hospitals in the city and in the district headquarters hospitals, and it is also desirable that, under the conditions of licence, firms which are given the privilege of importing all drugs, poisons and otherwise, should compulsorily be required to have on their staff one or more experts in pharmacy of this class. There has been so long a concentration on quantitative production, that it is time that our attention were drawn to a qualitative production, and in course of time, it should be the endeavour of the Government to encourage very largerly the substitution of the trained pharmacist in every large concern.

I have not ventured upon the question of the indigenous medicines, as I cannot lay claim to a sufficient acquaintance with them, to offer any useful suggestions.

(25)

By Dr. C. V. Natarajan, B.Sc., M.B.B.S., D.P.H., Superintendent, Health Institute, Bangalore

The necessity for controlling drug traffic and drug adulteration is a long-desired want. Locally-manufactured indigenous preparations as well as imported preparations fall very often very low regarding their potency. Perhaps some of them might do so because of their mode of preparation. Digitalis, Strophanthus and Ergot are well-known examples. There does not seem to exist any reliable mode of assay available in the laboratories manufacturing these drugs indigenously nor are the herbs collected at the time of their full potency. Another unknown factor is the period of maintenance of the full potency of such extracts and tinctures during transportation and storage at the existing temperature of tropical climates.

Adulterants are very commonly used in retail trade. Very often it is very difficult to detect these; it is not uncommon for three grains of Santonin to contain about half a grain of this stuff along with Soda Bicarb or plain saw dust as adulterant. It is a problem difficult of solution to protect the poor against such adulteration—one way seems to be the cheaper local manufacture with proper control by a well-equipped Pharmacological Laboratory or by licensed firms (whose personnel is above suspicion) of drugs that are available in India or cheaper substitutes which may be just as easily available. This needs urgent research on the plant—products available in this country—the need for which is too well-known to be elaborated upon.

Regarding the biological products, anti-toxins which are so commonly imported from foreign countries like Diptheria and Tetanic Anti-toxins are found to retain their full potency; the same cannot be said of various anti-sera which are found flooding the market.

Anti-streptococcus and Anti-Dysenteric Sera have been found under experimental conditions not to be specific against the local strains available. The dilutions in most of these cases moreover (perhaps to cheapen their price) is far too great and large quantities are found to be necessary for therapeutic measures. A very great need for the classification of the strains of Streptococci and Dysentery bacilli is felt and anti-sera against these strains should be made available. This means the local manufacture of these anti-sera.

Regarding the glandular products, those imported from reputed firms either from United States of America, Great Britain or Germany, one cannot say that they are uniform in their activity. Only one glandular product, the Thyroid extract, seems to satisfy this condition; others do not seem to conform to any one uniform scale.

There is need for legislation regarding the sale of chemo-therapeutic substances like arsenicals, antipyretics and hypnotics. They should only be sold by licensed firms whose credentials are beyond reproach. Unfortunately the standard of education of the average chemist and druggist or the so-called compounder is far too low to allow him to exercise his discretion in the sale of such substances. The average bazaar sells such drugs to all varieties of people and has done great mischief in this way.

The art of prescription writing seems to be a lost one. There does not seem to be proper emphasis laid during medical education on the knowledge of incompatibility between various drugs, either chemical or physiological. The day of decent potable mixture being compounded, seems already to be vanishing. It is only recently that the faculties of medicine have recognized the necessity for chairs of pharmacology but even now the knowledge of drugs is relegated to a secondary place and emphasis is laid merely on knowledge of the dosage of each drug. The old method of teaching of pharmacological medicine by asking students to write a prescription for a given disease and discuss the necessity and place of the drugs in the recipes given is now no longer followed. Great mischief is also done by the flooding of sweet literature extolling the remarkable activities of proprietary medicines against diagnosed diseases. Good physicians themselves very often fall a prey to such widely advertised drugs and use them in their prescriptions.

The question of licensing vendors seems to be bound up with the question of medical registration and still more with the formation of an All-India Medical Council, matters which do not seem relevant to the scope of this enquiry.

There is great necessity for public education for protecting against the sale of proprietary drugs and patent medicines and it seems absolutely essential for the formation of an examining body like that found by the American Medical Association or that formed by the British Medical Association to examine and publish the compositions of the various nostrums sold to the gullible public.

It is also quite necessary to have a central well equipped laboratory which should examine the potency of all biological products as is done by the United States Public Health Department, so that each batch of such products is sealed with the approval of the central laboratory after careful examination. Both these two, viz., a chemical and a biological laboratory with equipment for pharmacological assay are absolutely essential.

(26)

By Dr. B. B. Dikshit, M.B.B.S., D.P.H., Professor of Pharmacology, Medical College, Vizagapatam

The operation of the Drugs Act in India

The subject may be considered under the following heads:—

(i) Manufacture of drugs.

(ii) Storage and sale of drugs.

(iii) Establishment of a central laboratory.

(iv) Financial considerations.

Manufacture of drugs.—This consists of (i) B.P. drugs or drugs which are not included in the B.P. but which are of well-known therapeutic value and (ii) new medicines including new indigenous drugs which are put for sale newly.

As regards B.P. drugs, the manufacturer should naturally comply with the requirements of B.P. Samples of these should be presented to the central laboratory from time to time for examination if the manufacturers do not employ a competent staff for the examination and standardization of the same.

In the case of new remedies, it should be essential for the manufacturer to submit his preparations for physiological examination to test the toxicity, etc., unless the use of such preparations is guaranteed by competent medical authorities, to be harmless.

All manufacturers should possess a licence for starting their business and no one without a licence should be permitted to manufacture drugs.

Labelling of preparations is considered hereafter. It may not be feasible to make the manufacturers submit their labels for approval but the central laboratory may advise them as to the nature of the label if so asked.

In labelling, enumeration of the names of diseases in which the preparation can be used should be avoided unless the manufacturer on a competent medical authority is in a position to prove his claims.

Sweeping statements of a general character, e.g., " useful in liver diseases " or " indicated in kidney disease " should be avoided and extravagant claims for the wonderful properties of the medicine should not be allowed unless backed by a competent authority.

Manufacturers cannot be asked to disclose all the ingredients and formulæ of their preparations, but regulations should exist to make the manufacturers disclose in prominent places of their labels names and, if possible, also quantities of the following substances:—

(1) alkaloids and other preparations and derivatives of opium; (2) cocaine, cocaine substitutes, derivatives and preparations containing cocaine; (3) all preparations containing alcohol; (4) drugs belonging to the poison group; (5) drugs like chloroform, cholaral hydrate, acetanilide, cannabis indica, etc.; and (6) other preparations and drugs which a medical board may advise.

Storage and sale of drugs.—This includes storage, sale, and dispensing of drugs, either manufactured locally or imported from abroad. At present any person, whether he possesses any knowledge of drugs or not, is permitted to trade in drugs. His aims will naturally be towards making indiscriminate profits and he will buy and sell the cheapest drug in the market without caring to see whether it will be adulterated or not, or whether it is a potent preparation. Adulterated and impotent drugs may therefore find a ready sale in the market because of the advantage they possess of being cheap. A qualified chemist who takes care to see that the stuff he is getting is of the proper quality has to run his concern at a disadvantage in an open competition. It should therefore be made essential that a man who trades in drugs must have in his employment a qualified chemist and druggist who will take care to see that the drugs he is getting are of the right quality.

To facilitate the ready recognition of a qualified chemist, the titles like " Dispensing chemist " or " Pharmacist " should be restricted to persons having in their employment a person possessing a diploma in pharmacy to supervise the work of dispensing.

Granting of excise and poison licences should strictly be limited to those persons who have a qualified chemist in their employment.

Sale of proprietary medicines and patent preparations imported from abroad could be efficiently checked only by educating the public but control may be attempted by putting some sort of control on the very wide advertising and an import duty on preparations of doubtful value.

Establishment of a central laboratory.—The laboratory should be under the direct supervision of a highly qualified pharmacologist, assisted for the present, by two pharmacologists who are medical graduates and four chemists with a special training in pharmaceutical chemistry, together with the other ordinary laboratory staff.

The functions of the laboratory should be—

(1) to examine and assay, chemically and biologically, samples of preparations sent to them for examination and report; and

(2) to carry on physiological experiments on new preparations, if desired by the manufacturer to do so.

The samples sent for assay should be from manufacturers or from such persons who are authorized to do so. These should be the Health Officers of recognized municipalities and the Public Health Authorities of the Government. Employment of a separate staff as sample collectors will be advantageous but for the present it will be more costly.

As conditions at present stand, it will be sufficient to have only one Central Laboratory instead of having Provincial ones and by this plan the total expenditure may be considerably minimized.

Financial considerations.—Establishment of a laboratory will naturally mean an expenditure of some thousands and sources of income must be sought to meet the same. The following sources may be considered:—

(1) Fees for issuing licences to the manufacturers.

(2) Fees for testing drugs sent by manufacturers.

(3) Fees for doing physiological experiments for the manufacturers.

(4) A certain amount to be paid by the municipalities who send samples for examination.

(5) Import duty on some imported products of doubtful value. These sources may not be sufficient and, if so, the Provincial Governments may be asked to contribute towards meeting the extra costs.

(27)

By Dr. Nabajiban Banerji, 44, New Theatre Road, Calcutta

So long as men will trade with drugs and chemicals, though it is for the use of human life, it is liable to be under-strength or unstandardized, for the obvious reason that the object of the trader is to make a profit and for no other benevolent or charitable purpose. It is so in every country. The accuracy, strength or standardization will be more or less as will be necessary for a higher sale, that is to say, the trader seeks reliability in the eyes of the public. Therefore public opinion is a most important guiding factor for raising the standard of accuracy in the drug trade.

Drug as is being used by our people will be divided into three systems:—

(*a*) Allopathic.
(*b*) Ayurvedic.
(*c*) Unani.

I do not wish to take up either the Ayurvedic or the Unani system. We know that the Ayurvedic system has got a very rich pharmacopœia and it is unwise to deal them with any legislation until we have thoroughly studied them with experimental research work for some time.

Dosage.—The dosage of a particular drug will depend upon the (1) quality of drug itself, and (2) individual on whom the drug has to be applied. There are, therefore, three factors which we have to deal with:—

(1) Dosage.
(2) Drug standard.
(3) The normals of Indian constitution.

The quantity of drug required will depend upon the (1) eliminative factor guided by kidney function, the amount of circulation maintained by blood-pressure and pulse-rate, (2) oxidizing power calculated by the quality and quantity of blood and (3) body weight.

Judged from these points of view, a drug pharmacologically standardized for an European constitution with an European data should not be taken as standardized for the Indian constitution. Therefore the unit of pharmacological standardization has to be changed. Another factor which has to be remembered in this connexion is the deterioration which is inevitable on account of our tropical climate. Imported drugs have to suffer more in this respect, being prepared under a different climatic condition

and having to be stored a long time before and after arrival in this country until it is being drawn for use. The standardization with regard to sera and vaccines has to be seen from an entirely new angle. The toxin contained in hundred million organisms is sometimes much higher than what we get from thousand million organisms of a similar type of strain, from abroad. The Indian bacteriologists have therefore found out their own dosage for vaccine therapy and it is quite different from those prevailing in other European countries.

Imported drugs.—When our country is not in a position to produce all fine drugs and chemicals we will have to indent many of them from abroad. Our experience in this connexion is that the amount of good is far in excess of bad, if it be at all. For example, I have not personally come across any serious accident by application of foreign or imported drugs.

Drugs of local manufacture.—We have practically given up using foreign vaccines, and serums partially. Drugs of local manufacture, although they may have not been standardized, still gave good results. It may be due to their freshness.

Legislation.—Legislation is neither possible nor judicious until the following factors are established:—

(1) Physiological normals for Indians.
(2) Normal eliminative and metabolic co-efficients.
(3) Pharmacological assay of different drugs, especially sera and vaccines manufactured in India, and finding out the unit of pharmacological standard.
(4) The rate of deterioration with regard to each drug.

This will help us to compile an Indian Pharmacopœia.

It may be that there has been and will be some adulteration in the drugs we are using but the expenses of a well-equipped laboratory in finding out the amount of adulteration of each and every drug either manufactured in India or coming from abroad whose average value is about two and a half crores of rupees will hardly be worth while until a host of pharmaceutical chemists has been trained in the Provincial Universities of India for manning such a laboratory.

A research laboratory should be started immediately for carrying out the above purpose. State departments for the manufacture of drugs and chemicals may be started in the similar line as they have been doing with quinine manufacture.

(28)

By J. N. Rakshit, Esq., F.I.C., F.C.S., Chief Chemist, Gazipore Opium Factory, Gazipore

A Central Chemical Laboratory for food and drugs control in India.

1. Central chemical laboratory for food and drugs control may be a department under the Government of India.

2. This laboratory may be situated at Calcutta.

3. Working of this laboratory shall be guided and advised by a council represented by—

(*a*) allopathic, ayurvedic and unani practitioners,
(*b*) pharmacists and druggists,
(*c*) analysts,
(*d*) official members from administrative, medical and health departments.

4. *Staff*:—

(*a*) Chief chemist— Pay, Rs. 1,000—100—1,500	1
(*b*) Deputy chemist— Pay, Rs. 400—50—1,000	2
(*c*) Assistant chemist— Pay, Rs. 150—15—400	Number according to requirement.

(*d*) Office Superintendent—
Pay, Rs. 100—10—250 1
(*e*) Typist—
Pay, Rs. 50—5—100 2
(*f*) Clerk—
Pay, Rs. 45—5—80 2
(*g*) Menials—
Pay, Rs. 15—1—25 1
Pay, Rs. 12—1—17 ... ... Number according to requirement.

5. *Duties.*—(*a*) Co-ordination with all analytical and research Government, and approved and affiliated private, chemical laboratories in India.

(*b*) Conduct researches on—

(i) fixation of standards for foods and drugs for sale in India,

(ii) methods of analysis, and

(iii) other pharmacological problems.

(*c*) Routine analysis of samples.

(*d*) Supervision over periodic and systematic supply of samples for chemical examination and research (i) by registered official and non-official medical practitioners, (ii) by departmental special inspectors and (iii) by respectable citizens nominated by District Magistrates.

(*e*) Publication of annual reports.

(29)

By the Pharmaceutical Society of India, Madras

The Pharmaceutical Society of India was started in the year 1923 under the name of "The Pharmaceutical Association" but was changed into the "Pharmaceutical Society of India" in March 1925.

The Society at present has about 35 members qualified from the Madras Medical College on its rolls, and the working is carried on by a President, three Vice-Presidents, a Consulting Pharmacologist from the medical profession and five members of the Committee.

The foremost aim of the Society is to have a federation of qualified pharmacists in India with a view to establish an uniform system of education for qualification as pharmacists and have a compulsory registration of pharmacists and control over the pharmacies in India. The Society has from its very beginning offered to co-operate with the Government to re-arrange the present Syllabus of Pharmacy and establish teaching centres and award diplomas for qualified candidates. The Local Government has only recently recognized the Society and appointed one of its Members on the Board of Examiners for the Chemist and Druggist Examination of the Government of Madras.

It is also the aim of the Society to establish a Laboratory to study the indigenous drugs of India with a view to incorporate the useful ones in an Indian Pharmacopœia, should it be published.

The Society is now pressing on the Government the need of a "Poisons and Pharmacy Act", restriction of dispensing to the qualified chemists and raising the standard of examination of the compounders to make them more useful to the pharmaceutical profession. The Madras Medical College has a special course of study for those qualifying as chemists and druggists. No other Medical College in India has such a course. The syllabus of the same is appended herewith for the information of the Committee. The Society intends to move the Government, to establish similar courses in all the Medical Colleges in India so that when the Pharmacy Act comes into force there will be a sufficient number of qualified men to take up service under the Act.

It is only when such training is given that we shall be able to staff this important profession of pharmacy with persons best fitted to handle medicaments of every description, to compound and dispense them and thus safeguard the public. The trained pharmacist by the aquisition of adequate knowledge of all that is requisite in modern prophylactic and curative treatment will be able to prove his fitness to be regarded as something more than a retailer of chemicals and other people's products.

The dearth of candidates for the course of Chemists and Druggists in the Madras Medical College is due to want of public support as well as Government encouragement to the candidates who have passed out. The Government of Madras even though they have a large number of dispensaries have found employment only for two qualified men, while the Madras Medical Stores which is the biggest manufacturing concern in India has only one Madras qualified man. Owing to the unfair competition of the drug market, the qualified pharmacist is not able to do any business in drugs and the private medical practitioners having their own dispensaries minimise the number of prescriptions going to him for dispensing.

The Society has also brought to the notice of the Government of Madras the need for better safeguarding the public in the matter of sale of poisons and the dispensing of prescriptions by not properly qualified men. The following summary presents some of the points which need urgent legislation.

Dispensing in Government hospitals.—The Dispensing in all the Government, Local Fund and Municipal Hospitals in Madras is carried entirely by compounders. The medical man in charge is supposed to supervise the work but in actual practice, owing to his professional work, it is left entirely in the hands of the compounder. In the Madras General Hospital a sub-assistant surgeon is specially appointed for the work of supervision of the dispensing department. Sub-Assistant surgeons as a rule have very little training in pharmacy and do not possess an adequate knowledge of the pharmaceutical work which a trained pharmacist has. The Society has been pressing the Government of Madras to appoint a qualified pharmacist to supervise the dispensing in the large hospitals instead of posting a medical man for the purpose. In this connexion an extract from the report of the Surgeon-General to the Government of Madras on the Inspection of Civil Hospitals for the year 1929 will be read with interest:—

"The inspection of the medical institutions in each district was carried out regularly and satisfactorily by the respective district medical officers and civil surgeons. The Surgeon-General inspected 17 district headquarters hospitals, 4 civil surgeoncies and 53 mufassal hospitals and dispensaries. Major-General Megaw has introduced, in conjunction with the Analyst to Government, a method of testing the strength of quinine solution at dispensaries during inspections. When first introduced, this unexpected check revealed the most widespread fraud by compounders and showed that patients were getting only a portion of the drug intended for them. The continuance of this method of examination shows an improvement in the quinine mixtures, at any rate during inspection time."

Dispensing in doctor's pharmacies.—In Madras Presidency it is customary for most of the private practitioners to dispense their own prescriptions by employing qualified or unqualified compounders. In some places they also run it as a public pharmacy by dispensing prescriptions other than their own. As a medical man has to attend to his professional work the dispensing is left almost entirely in the hands of the compounder, who is lacking in adequate training and qualification. In the interest of the public, when a medical man runs a pharmacy as an adjunct to his professional practice and dispenses prescriptions other than his own, he should employ a qualified pharmacist to supervise the dispensing.

Drug stores.—Anybody whether he has a knowledge of drugs or not can open a drug store in India. He imports the drugs from the cheapest market and sells at cut rates, so that the qualified chemists who import drugs of guaranteed B.P. strength find it impossible to compete with them as in many cases their landed cost is much above the selling prices of these drug stores. As there is no restriction on dispensing of any prescriptions, some of these drug stores also run a dispensing department employing a compounder for the work. As the proprietor has little or no knowledge of pharmacy there is no check at all on the work of the compounder. The curriculum of the compounders does not include Chemistry, Botany and

Materia Medica and he therefore lacks the training which a qualified pharmacist posssesses and which enables him to foresee and deal with chemical reactions which may in some cases be intentional by the prescriber and in others unintentional and avoidable by special methods of dispensing. The rates usually charged by these drug stores for dispensing prescriptions are very low, the reason being as before stated, their import of cheap drugs irrespective of quality. Instances have come to the knowledge of the Society that some of them charge only eight annas for a six ounce mixture and twelve annas for an eight ounce mixture. This price hardly covers the cost of the medicines in most cases and in instances where the medical man has prescribed a costly drug, it can only be supplied either at the loss or the omission of the costly ingredient. It is quite impossible for the qualified chemist to do business by competing with these stores, as no customer will be willing to pay higher prices and is ignorant of the quality of the drugs to be used. Some of these stores do not possess all the licences under the Dangerous Drugs Act; consequently they do not supply the customer all his requirements, but direct him somewhere else thus causing a delay which may be dangerous to the patient. The qualified man is therefore not able to sell his drugs owing to the lower prices charged by the drug stores for drugs of an inferior quality, but are now menaced even more by their opening dispensing departments and charging the public such incredibly low prices.

Use of misleading titles describing business places.—The title "Pharmaceutical Chemists—Chemists and Druggists" should be restricted to qualified people so that the public may be able to discriminate between a shop where the dispensing of prescriptions and sale of poisons is supervised by a qualified chemist from those drug stores run by unqualified persons. By calling themselves pharmaceutical chemists, they not only mislead the public but are a serious potential danger as well. It operates most unfairly on the qualified pharmacist who has qualified himself by two years of study in a college and an year's practical training in a recognized pharmacy as well as passing an examination to perform certain services for the community and who may reasonably expect in return some protection against his being competed by persons who are not in a position to do the same by reason of their lack of training and qualification to render skilled service to the public.

Dangerous Drugs Act.—Licences under the above Act are granted by the Collector on the recommendation of the Excise Officials and not the Medical Department as the Act is administered by the Excise Department. The Commissioner of Excise is the final authority for the issue or cancellation of the licences. So long as the Excise Official is satisfied that any person can be trusted to conform to the regulations of the licences, he is granted a licence and there is no question, whether he employs a qualified person to handle and sell those drugs. In the interests of the public, this state of affairs should be stopped and licences only issued to qualified pharmacists or firms employing such qualified persons. The qualified chemist by reason of his status and knowledge will see that these dangerous drugs are supplied for legitimate medical purposes only.

The authority of the Excise Department should be restricted to the inspection of the licensed shops while the administration of the Act should be entrusted to a Board consisting of the Commissioner of Excise, the Surgeon-General with the Government and a representative of pharmacy.

Poisons Act.—This Act framed by the Government of Madras in 1919 is very defective. The following are treated as *poisons* under the Act: Aconite, Nux vomica, Perchloride of Mercury, Potassium Cyanide, Stramonium, White Arsenic, Red Sulphide, Yellow Sulphide and Phosphorous.

The preparations of these drugs are not included in the Act. The licence is granted to anybody who is considered by the Commissioner of Police or the District Magistrate as fit to stock and sell these poisons and so the licence is more meant for bazaar vendors rather than for qualified chemists. The Pharmaceutical Society of India represented to the Government of Madras that no excise or poison licences should be granted to wholesale dealers unless they employ qualified chemists and to which the Government of Madras in their G.O. Ms. No. 1307, P.H., dated the 26th May 1930, replied "The Poisons Act is intended to control the sale, not of poisons as such, but only of those poisons which are found to be employed to any appreciable extent for criminal purposes. In view of this restricted scope of this Act, the

Government do not consider it necessary to insist on the employment of qualified men by holders of poison licences. A provision of this nature should properly find a place in a "Sale of Drugs Act" which at present does not exist in this Presidency."

It is therefore for the protection of the public that a comprehensive Poisons and Pharmacy Act should be framed as early as possible.

The Society is of opinion that the draft Bil submitted by Lieut.-Col. C. H. J. Gidney, I.M.S., M.L.A., will satisfy the requirements, but that when wholesale dealers deal in poisons they should come under the provisions of this Act.

(30)

By Probodh C. Chattopadhyay, M.A., F.C.S. (Lond.), Perfumery Expert and Consulting Chemist and Proprietor, Scientific Supplies (Bengal) Company, Calcutta

Excise Regulations are too stringent for manufacturers. These must be made simpler, otherwise manufacture cannot take place.

Regarding raw materials, everything is to be imported from abroad (except Indian drugs) but it is not known if drugs that are sent from abroad are of the standard quality.

A central laboratory for analysis of drugs and finished preparations should be established at Calcutta, and a nominal fee should be charged for analysis. Exorbitant fees will nullify the utility of such a central laboratory.

Guarantee of purity of imported drugs is practically nil, except when same is imported from reputed makers or firms, it can be presumed that they are good, and up to standard.

Here also, there are many cases of gross adulterations, as for instance from personal experience I have found that clove oil as sold ordinarily is not clove oil, but mostly cedar oil scented with cloves, or clove leaf oil is passed as clove oil. Similarly artificial Geranium oil is sold as "Geranium Galle Afric." There are numerous such instances in case of essential oils, and even reputed makers are sending such stuff, apparently because importers ask that cheap stuff should be supplied. But reputed firms should not act according to such instructions, as that brings dis-repute.

Regarding purity of drugs, ordinary parties can do nothing but to depend on the statement on the label. It is for this reason that a central laboratory is desired.

Many articles are prepared specially for India. Apparently such makers know that adulterated stuff can be easily sold in India, for want of a Food and Drugs Act, in India. Such articles cannot be sold in any other country.

To ensure that all drugs be of standard strength, a certificate by makers on the label is sufficient. But in the case of special preparations, such as vaccines and physiological preparations, a certificate of the analyst should be fixed as well, with batch number and date of analysis, etc.

Regarding compounders, the examination should be conducted by a School of Pharmacy or Pharmacology, where the lowest examination shall be that of a compounder, and the highest examination shall be regarding manufacture of medicines or pharmacology, as it is called. The central laboratory shall be a part of this school. Standardization of drugs, medicines and vaccines should be conducted in this central laboratory.

Regarding poison regulation, I suppose that the revised rules will be less vexatious than the present rules. As these rules were drawn up in consultation with me, I have nothing to add to the same.

Control of therapeutic agents on the lines in force abroad is desired in some form, though not very strictly in the beginning.

Regarding indigenous medicines, nothing need be done at present, specially regarding Kaviraji and Hakimi medicines. These can be examined later on, by the school of pharmacy suggested, where research work must be done, before anything be done to standardize Kaviraji and Hakimi medicines.

Regarding proprietary medicines, those with secret formulæ, except Kaviraji and Hakimi medicines, may be registered, where the formulæ should be noted and recorded, and the registration number may be put on the label. Any member of the public may have a copy of the formula by payment of a fee to the registering department. I suggest the line of P. J. Formulary, etc., as in existence in England.

Where the formula of a proprietary medicine is given on the label, or on a wrapper with the phial, such formula need not be registered. In the case of many imported stuff, the formula and does must be stated in detail on the label, such as Sal Hepatica, Zambuk, Beecham's pills, etc. Doctors should refrain from using patent medicines. Nowadays big doctors refuse to write a full prescription, but only note that the patient is to purchase a particular "patent medicine". This means too much expense in treatment, on the part of a patient.

Pharmacopœia.—There should be a special pharmacopœia for India, as it is in all other countries. The requirements of India are quite different from those of England. I cannot understand why the B.P. should be standard in India. Of course, in the absence of a special pharmacopœia for India, the B.P. can be used. The Indian Pharmacopœia should be revised every ten years.

Licence to manufacture medicines should not be given to any and every party unless the party can prove that he has employed a chemist, and proper staff; I mean regarding manufacture of tinctures, extracts etc. Otherwise, inferior medicines will be on the market. If this is regulated, for the present, then many inferior and under-strength medicines will disappear from the market.

Manufacturers from abroad should be asked to make the preparations in this country, so that everything may be made in India, and there won't be unfair competition among makers. Makers from abroad won't then undersell the products and destroy Indian firms, by temporary underselling.

Government should patronize medicines made in India, in preference to those made from abroad for all tinctures, extracts, etc., except for such articles as are not made in this country at the time.

(31)

By Prof. R. F. Hunter, D.Sc. PH.D., D.T.C., A.R.C.S., A.I.C., Adviser on Chemotherapeutic Research to the Laboratory of Applied Pathology and Preventive Medicine, Manchester

The necessity of developing the study of chemical pharmacology in India

The scientific study of chemical pharmacology is a matter of vital importance to India from several points of view. In the first place, there is the important question of research work on the synthesis of medicinals for specific purposes, such as the combating of diseases of protozoal origin by chemotherapeutic means. Secondly, the study of chemical pharmacology provides the necessary means for obtaining reliable information regarding the physiological activity of naturally occurring plant products which are reputed to have medicinal properties. Thirdly, it enables definite standards (therapeutic index, etc.), to be set up for natural drugs, or their essential constituents, in the form of a medical pharmacopœia.

The essentials for developing the study of pharmacology are, firstly, to establish well-equipped departments of medical and biochemistry, to work in collaboration with already existing schools of organic chemistry which are quite capable of dealing with the synthetical side of the work, and Research Studentships, to encourage post-graduate work of this character, on the lines which are being carried out by the Department of Scientific and Industrial Research in Great Britain.

The Medical departments must involve sections for animal testing which will observe the following points in relation to technique:—

(i) The breeding of a standard strain of animal under standard conditions of light, diet, cleanliness, and temperature.

(ii) The use of an animal not differing greatly from the normal weight of its species and at an age which is comparatively uniform.

(iii) The performance of all experiments upon animals which have been fasted for 18 hours, using a standard technique of injection, such as the method recommended by the Hygenic Laboratory at Washington, D.C., in connexion with the standardization of arsenicals.

(iv) The use of standardized methods for obtaining the required pathological condition.

(v) The use of a sufficiently large number of animals for each experiment, in order to reduce, as far as possible, any uncertainty concerning the results.

(vi) The use of a standard infection where antibacterial and antiprotozoal substances are being tested [It has been shown for instance, by Kolmer (J. Infect, Dis., 1915, 17, 79) and Voegtlin and Smith, (J. Infect. Dis., 1817, 20, 35) that in testing the efficacy of trypanocidal substances a uniform infection was essential for the production of comparable results.]

Regarding the synthetical side of the work to be carried out by existing schools of organic research in the universities, the obvious scheme which presents itself is the system of Team Work; major problems being divided into sections which can be carried out by different post-graduate students working under the direction of an investigator of established reputation.

A suggestion which might well be made in this connexion to the various Indian universities, would be the introduction of a post-graduate course in chemical pharmacology for students who have graduated in chemistry. A Master of Science degree in this subject could be given, say on a two years course from graduation; the first year consisting of study of biochemistry and pharmacology, and the second year being devoted to original work on the synthesis of medicinal substances, or in investigating the physiologically active constituents of plant products in collaboration with the bacteriological laboratory.

APPENDIX D

Adulterated medicines

I*

Most of the replies (10) from *Burma* are from officials who have no reason to suspect that the drugs they use are of defective strength or impure quality. Other officials (4), however, state their suspicions about the purity of the drugs their patients are getting, and three of them express the reason of their doubt by giving a list of articles, both imported and locally manufactured, which they found to be either adulterated or of inferior quality.

All the answers (11) from *Assam* are from officials who, procuring their drugs from either the Medical Stores Depots or firms of repute, are satisfied with their quality and strength.

In the *Bengal Presidency*, opinion, whether official (32) or non-official (31), is divided; but the odds (39) are on the side of dissatisfaction.

All the answers (30) from *Bihar and Orissa* are from officials whose opinion is equally divided.

In the *Madras Presidency*, opinion, whether official (59) or non-official (26), is divided. The majority of the answers (52), however, tend to show that medical practitioners are satisfied with the quality and strength of the drugs they prescribe.

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* Summary with reference to answers and memoranda. See also extracts set out in Appendices B and C. Numbers within brackets represent the number of persons who gave the answers.

Except for a few officials (9) attached to Military or Civil Hospitals, medical practitioners in the *Punjab*, both official (30) and non-official (13) are very loud in their condemnation of the drugs they are supplied with.

Most of the replies (9) from the *North-West Frontier Province* are from officials who have no reason to doubt the purity and strength of the drugs supplied by the Medical Stores. One officer, however, and one non-official state that they have had occasion to think the drugs they used were either of defective strength or impure quality.

In the *United Provinces* opinion, whether official (58) or non-official (16), is divided; but the greater number of practitioners (50) think they have every reason to suspect the purity or strength of the drugs prescribed to their patients.

Replies (15) from the *Central Provinces* are mainly from officials (13). Most of them (10) complain of the unsatisfactory condition of the drugs they have to use.

Official (35) and non-official (21) opinions in the *Bombay Presidency* are divided; but the greater number (35) of practitioners are satisfied with the strength and quality of medicinal drugs.

Replies from the Indian States of Western India, Rajputana and Central India (20), point to a satisfactory state of affairs, as far as medical drugs are concerned: most of them (14) indicate that there is no reason to suspect their purity and strength.

The answers to question 2 of the Questionnaire as to the personal experience of adulteration or inferior quality in medicinal preparations go to show that no distinction need be made between imported and locally manufactured medicinal preparations.

The situation is clearly defined by Major D. Clyde, I.M.S., Civil Surgeon, Meerut:—

"Especially with drugs such as quinine, cinchona febrifuge, santonin, digitalis, nux vomica, magnesium sulphate, cascara, vinum ipecacuanhæ, one never knows the action from any given dose. A feature of the Indian market is that stock medicines are labelled with the name and do not give the strength. Many firms import two qualities of the same medicine (for instance oil Eucalyptus B.P. which you can rely on and a cheaper quality at one-third the price)—Manufacture of tinctures (except for diluting concentrated tinctures) should be prohibited, except by firms employing qualified pharmaceutical chemists, and having facilities for grading raw material and assaying it."

As regards indigenous drugs, Messrs. Smith, Stanistreet & Co., Ltd., Manufacturing Chemists, Calcutta, observe:—

"It is frequently quite impossible to obtain a pure and unadulterated indigenous drug in the market; in fact it is hardly too much to say that in India all products that lend themselves in any way to adulteration are adulterated, and only those whose properties and appearance are such as to make it impossible to practice substitution that escape it, and those products are very few as we have even had Strychnos Potatorum seeds (Clearing Nuts) containing no Strychnine offered us as Nux Vomica seeds, and many other weired and wonderful attempts which could deceive no one who had any knowledge at all of the product but which evidently are successful with the unfortunate public."

Most of the evidence is based on clinical results and in the words of the Civil Surgeon, Champaran:—

"It is extremely difficult to define whether one medicine is of inferior quality or adulterated or both. Mere failure in action on a patient may be due to short dosage or wrong selection of medicines. Adulteration can be correctly found only by chemical tests."

Mr. P. Das, PH.C., M.S., etc., writes:—

"There are a few manufacturers of pharmacoppœial preparations, that we know of, who have been putting into the market drugs that are supposed to be of the B.P. strength but which, in fact, are much below the B.P. standard both in alcohol and drug contents. Some of them cleverly put on the label the name of the pharmacopœial preparation and under the

name of the manufacturer (which are generally some assumed names and not the real name of the manufacturer) some misleading statements like 'Manufacturers of B.P. Drugs' to make the customers believe that the preparation itself is of the B.P. standard. Such low standard preparations are obviously sold in the market at very cheap prices and such trade is quite large in this country as almost all the customers—including the local and district boards, municipalities, and even the Government institutions—base their purchases mainly on the price unit with very little consideration, if any at all, to the quality.

"We also find in the market a number of preparations with labels showing the names of some European firms as manufacturers with the sole object of misleading the customers as if the preparations are made actually by European firms, although the actual manufacturers are Indian and in the majority of cases are absolutely laymen. We know of certain firms, going under such pseudo European names, purchasing medicines, etc., from the bazaar, diluting same to their utmost limit and adding some colouring and flavouring matter, etc., to keep the appearance of the same like original and selling at quite cheap prices with great profit."

Captain P. De, B.SC., M.B., M.R.C.P., Officiating Professor of Pharmacology, School of Tropical Medicine, Calcutta, writes:—

"I have carried out a good number of biological assays of the drugs prepared in India and have found that about one-third of the tinctures of digitalis are below the pharmacopœial standard, and also many of the other tinctures that were assayed were found below standard."

Smith, Stainstreet & Co., Ltd., Manufacturing Chemists, Calcutta, remark:—

"A good proportion of the imported drugs, that are adulterated or are of weak strength, are such that could not be, by any chemical test, proved to be other than what they should be. We refer to such things as extract of Gentian, liquid and solid extracts of Liquorice, Taraxacum, Damiana, Cascara, and many others; mixed powders like compound liquorice powder, provided there is a good proportion of the genuine article present and such things as extractive, spirit strength, solubility, and so forth had been arranged; for it would be very difficult to give any proof that would satisfy a Court of Law that such a preparation was not what it should be, but any trained pharmacist would have no doubt whatever about its quality and would promptly reject it. In these cases it is not legislation but education that is required."

Civil Surgeon of Cochin says:—

"A few years ago, Madras Medical Stores used to supply cocaine hydrochloric which was of a very inferior nature. It was hardly soluble in water and was very irritating to the eyes. The medical store equipment list mentioned two kinds of cocaine hydrochloride—one cheaper than the other. The cheaper kind did considerable harm and the better kind was not available."

And the District Medical Officer, Anantapur:—

"On a few occasions as per instructions from the Officer-in-charge of the Medical Stores Depot, Madras, a few drugs such as Chloroform, Ether purificatus, Sulpharsenol and N.A.B., had to be returned to the Stores as they were found to be unfit for use."

Mohan K. Shah, Bombay, writes:—

"Indian dealers, in order to compete and sell cheaper, indent and import drugs and medicines of cheaper values without any concern for their quality and pharmacopœial values. In order to meet this market and to compete among themselves, some foreign manufacturers supply drugs, etc., of inferior quality and of non-B.P. strength.

"I come across cases of adulterations. In some cases original imported containers are tampered with and again repacked after gross adulteration while in others empty containers are locally filled with useless materials and got up as imported original packed articles."

And the Sind Medical Union, Karachi:—

"We have no means to ascertain the extent to which these drugs are adulterated or are of inferior quality; but from the clinical experience we do feel that there are some drugs of different effective value. It is a patent fact that some European firms that export drugs to India, manufacture them specially for India. We cannot understand what difference does it make when they are used in this country. The ostensible plea is the climate which holds good for biological products, but for other drugs we feel that real point is the cheapness and the inferiority of the stuff they send for our consumption. European firms of countries, where their Governments protect their people by special Drugs Acts, export to India, at times, drugs that are condemned by the authorities for their home consumption. It is a pity that these Governments allow firms to export drugs to India without any State control which they exercise in their own country. We have no requisite knowledge to judge their quality nor are there institutions, public or private, who can help us in the matter. We rely on the reputation of the firms that supply us and the prices we pay, both of which factors cannot be always reliable. We also feel that high prices, specially of biological products, do not necessarily mean superior quality."

II*

† (a) Pharmacopoeial preparations.

I.—Adulterated.

Quininæ sulphas	(68)
Asafetida	(27)
Potassii iodidum	(25)
Magnesii sulphas	(24)
Acidum acetylsalicylicum	(16)
Cocainæ hydrochloridum	(13)
Sodii bicarbonas	(13)
Sodii salicylas	(13)
Bismuthi subnitras	(11)
Bismuthi carbonas	(10)
Ferri et Quininæ citras	(10)
Iodoformum	(9)
Acidum boricum	(7)
Potassii citras	(7)
Bismuthi salicylas	(6)
Hexamina	(6)
Quininæ Ethyl carbonas	(6)
Syrupus glucosi	(6)
Sodii sulphas	(5)
Acacia gummi	(4)
Caffeinæ citras	(4)
Sodii iodidum	(4)
Santonnum	(3)
Emetinæ hydrochloridum	(3)
Extractum Belladonnæ	(3)
Oleum Eucalypti	(3)
Paraffinum molle	(3)
Quininæ bisulphas	(3)
Quininæ hydrochloridum acidum	(3)
Sodii citras	(3)
Acidum salicylicum	(2)
Ammonii carbonas	(2)
Calcii lactas	(2)

* Summary of the evidence for the whole of India. List of preparations mentioned as adulterated or inferior in quality by the witnesses in reply to questions put to them. The figures in brackets represent the number of complaint made. Where no figure is shown the number is one.

† Under the pharmaconœial preparations may be found one or two not actually in the British Pharmacopœia. They have been included here for the sake of simplicity.

Paraffinum liquidum ... ... (2)
Physostigminæ sulphas ... ... (2)
Pilula hydrargyri ... ... (2)
Quininæ hydrochloridum ... ... (2)
Sodii Benzoas ... ... (2)
Spiritus ætheris nitrosi ... ... (2)
Zinci oxidum ... ... (2)
Acidum carbolicum ... ... (2)
Aether purificatus.
Alcohol absolutum.
Aloe.
Ammonii chloridum.
Argenti nitras.
Argyrol.
Atropinæ methylbromidum.
Belladonnæ radix.
Benzoicum.
Extractum cascaræ sagradæ siccum.
Ferri et ammonii citras.
Glucosum.
Homatropinæ hydrobromidum.
Hydrargyri subchloridum.
Ichthyosulphol.
Injectio morphinæ et atropinæ hypodermica (Tablets).
Linimentum ammoniacale camphoratum.
Mel depuratum.
Menthol.
Moschus exsiccatus.
Myrrha.
Oleum amygdalæ.
Oleum cajuputi.
Oleum ricini.
Oleum santali.
Oleum terebinthinæ.
Phenacetinum.
Plumbi acetas.
Pulvis glycyrrhizæ compositus.
Pulvis ipecacuanhæ compositus.
Pulvis jalapæ compositus.
Pulvis rhei compositus.
Pulvis sodæ tartaratæ effervescens.
Sapo durus.
Sodii phospas.
Spiritus ammoniæ aromaticus.
Styrax præparatus.
Syrupus ferri iodidi.
Thymol.
Tinctura aurantii.
Tinctura cardamomi composita.
Tinctura iodi.
Viburni cortex.
Zinci sulphas.

II.—Inferior quality.

In general tinctures, essential and fixed oils, spirits, wines, liquid extracts, compound powders.

Tinctura digitalis ... ... (93)
Extractum ergotæ liquidum ... ... (63)
Quinine preparations ... ... (31)
Chloroform ... ... (20)
Pulvis ipecacuanhæ compositus ... ... (16)
Cinchona preparations ... ... (15)
Tincture cardamomi composita ... ... (13)
,, iodi ... ... (10)
,, strophanthi ... ... (9)

Syrupus ferri iodidi ... ... (8)
Ferri et quininæ citras ... ... (7)
Tinctura nucis vomicæ ... ... (7)
Vinum ipecacuanhæ ... ... (7)
Adrenalin chloride solution ... ... (6)
Extractum belladonnæ liquidum ... ... (6)
Extractum ipecacuanhæ liquidum ... ... (6)
Oleum cinnamomi ... ... (5)
Spiritus ætheris nitrosi ... ... (5)
Aether purificatus ... ... (4)
Extractum glycyrrhizæ liquidum ... ... (4)
Oleum hydnocarpi ... ... (4)
,, menthæ piperitæ ... ... (4)
,, morrhuæ ... ... (4)
Tinctura hyoscyami ... ... (4)
Unguentum hydrargyri ... ... (4)
Extractum carearæ sagradæ liquidum ... ... (3)
Oleum eucalypti ... ... (3)
,, terebinthinæ ... ... (3)
Pituitrin ... ... (3)
Syrupus eastoni ... ... (3)
Tinctura belladonnæ ... ... (3)
,, camphoræ composita ... ... (3)
,, cannabis indicæ ... ... (3)
Confectio sennæ ... ... (2)
Emplastrum belladonnæ ... ... (2)
Extractum sarsæ liquidum ... ... (2)
Injectio morphinæ hypodermica ... ... (2)
(Tablets)
Linimentum belladonnæ ... ... (2)
,, terebinthinæ ... ... (2)
Mistura bismuthi composita cum Pepsine ... ... (2)
Oleum ricini ... ... (2)
Opium ... ... (2)
Pulvis glycyrrhizæ ... ... (2)
Pulvis rhei compositus ... ... (2)
Spiritus ammoniæ aromaticus ... ... (2)
Tinctura moschi ... ... (2)
,, opii ... ... (2)
,, rhei composita ... ... (2)
,, urgineæ ... ... (2)
Acidum sulphuricum aromaticum ... ... (1)
Balsamum peruvianum.
Chlori liquor.
Collodion flexile.
Copaiba.
Extractum filicis Maris.
,, grindeliæ liquidum.
,, hydrastis liquidum.
,, taraxaci.
Injectio strychninæ hypodermica (Tablets).
Iodoform antiseptic gauze.
Liquor adrenalin hydrochloricus.
,, morphinæ hydrochloridi.
,, picis carbonis.
,, strychninæ hydrochloridi.
Mistura chlori cum quinina.
Oleum caryophylli.
,, lavendulæ.
,, olivæ.
,, santali.
,, tiglii.
Paraffinum liquidum.
Pepsinum.
Pilula ipecacuanhæ cum Scilla.

Pulvis cretæ aromaticus cum opio.
,, ipecacuanhæ Co.
,, jalapæ compositus.
Spiritus camporæ.
Syrupus calcii hypophosphatis.
,, ferri phosphatis compositus.
,, glycerophosphatis compositus.
,, calcii hypophosphatis.
Tinctura Aconiti.
,, Arnicæ.
,, Aurantii.
,, Belladonnæ.
,, Benzoini composita.
,, Buchu.
,, Capsici.
,, Catechu.
,, Cinchonæ composita.
,, Ferri perchloridi.
,, Gentianæ composita.
,, Ipecacuanhæ.
,, Kino.
,, Pruni virginianæ.
,, Senna composita.
,, Stramonii.
Unguentum gallæ cum opio.
Vinum antimoniale.
,, colchici.

(*b*) PROPRIETARY PREPARATIONS.

I.—Adulterated.

Sulpharsenobenzol	(5)
Novarsenobenzol	(3)
Aristochin	(2)
Novocaine	(2)
Ostelin	(2)
Sanatogen	(2)

Aletris.
Cascara evacuant.
Helonias compound.
Protargol.
Salvarsan.
Sargol.
Soda mint tablets.

II.—Inferior quality.

Camphorodyne	(2)
Chlorodyne	(2)
Vegetable laxative pills	(2)

Aletris cordial.
Antiphlogistine.
Blue tablets.
Brand's essence of chicken.
Genasprin.
Hæmoglobin syrup.
Infant foods.
Lysol.
Novarsenobenzol.
Ostelin.
Sanatogen.
Sulpharsenobenzol.
Virol.

III*

Name.	Origin.	Result of analysis.	Remarks.
1. Acidum Acetylsalicylicum.	Imported ..	Free Asetic and Salicylic Acids.	
2. Acidum Boricum ..	Do. ..	Arsenic in excess of B.P. limit.	
3. Acidum Hydrobromicum Dilutum.	..	Deficient in Hydrobromic Acid.	Should contain 10 per cent.
4. Acidum Hydrocyanicum Dilutum.	..	Deficient in Hydrocyanic Acid.	Should contain 2 per cent.
5. Bismuthi Carbonas ..	Imported ..	All containing about half the standard proportion of Bismuth Oxide.	
6. Bismuthi Subnitras ..	..	Do.	
7. Bismuthi Salicylas ..	..	Do.	
8. Caffeinæ Citras ..	..	Mixed with Pot. Citrate ..	
9. Chloroformum ..	Imported ..	Failed to pass the B.P. Standard.	
10. Cinchona Febrifuge..	Germany ..	Consisting of Powdered Cinchona Bark.	Should be sulphate of total alkaloids.
11. Extractum Belladonnæ Viride.	Do. ..	Several samples varying from nil to 0·05 per cent Belladonnæ Alkaloids.	Should contain about 1·0 per cent.
12. Extractum Cascaræ Sagradæ Liquidum.	..	Physiologically inert. ..	
13. Extractum Ergotæ Liquidum.	..	Do. ..	
14. Extractum Ipecacuanhæ Liquidum.	Germany ..	Several samples varying from nil to 1·0 per cent Ipecacuanha Alkaloid.	Should contain 2·0 per cent.
15. Essential oils	Germany, France and Holland.	....	Many samples of different varieties labelled synthetic are 'fictitious'.
16. Ferri et Quinine Citras.	Great Britain, Germany.	Several samples varying from nil to 5 per cent anhydrous Quinine Alkaloid.	Should contain 15 per cent.
17. Do.	Germany ..	This proved to be Green Iron Ammonium Citrate.	
18. Hydrargyrum Subchloridum.	..	Contained Perchloride of Mercury.	
19. Iodoform	Imported ..	Sulphur present. ..	
20. Liquor Iodi Fortis ..	India ..	Deficient in Iodine. ..	
21. Magnesii Carbonas ..	..	Contained Iron and Sulphate.	
22. Magnesii Oxidum ..	..	Contained Iron and Sulphide.	
23. Magnesii Sulphas ..	..	Contained Iron, Chloride and Arsenic.	
24. Methylene Blue ..	..	Contained Zinc. ..	
25. Potassii Carbonas ..	..	Contained Chlorides and Sulphates.	
26. Potassii Citras ..	India ..	Mixed with Pot. Carbonate.	

* Drugs which have been condemned after analysis by witnesses. The data are not complete but the list serves to show that many drugs are adulterated.

Name.	Origin.	Result of analysis.	Remarks.
27. Potassii Iodidum ..	..	Contained Iodate and Bromide.	
28. Potassii Sulphas ..	..	Contained Chloride and Sulphate.	
29. Pulvis Cretæ Aromaticus Cum Opio.	Imported ..	Deficient in Opium ..	
30. Pulvis Kino Compositus.	..	Do. ..	
31. Pulvis Ipecacuanhæ Compositus.	..	Deficient in Ipecacuanha.	
32. Saccharine	India ..	70·85 per cent Lactose ..	
33. Sodii Chloridum ..	..	Contained Calcium and Magnesium Sulphates.	
34. Sodii Iodidum .	..	Contained Sodium Chloride.	
35. Sodii Phosphas ..	..	Contained Sulphates ..	
36. Sodii Sulphas ..	..	Contained Chlorides ..	
37. Sodii Sulphas Ex. ..	..	Do. ..	
38. Spiritus Aetheris ..	India ..	Deficient in Ether ..	
39. Spiritus Aetheris Nitratis.	Do. ..	Deficient in Ethyl Nitrate.	
40. Syrupus Ferri Iodidi.	Do. ..	Deficient in Iron Iodite ..	
41. Syrups generally ..	Do. ..	....	Many sweetened with Saccharine.
42. Unguentum Hydragyri.	Imported ..	Less than 10 per cent mercury.	Should contain 30 per cent.
43. Vinum Ipecacuanhæ.	India ..	Only half strength ..	

IV*

Nature.	Origin.	Should contain	Found by analysis.	Nature.	Origin.	Should contain	Found by analysis.
		GRAIN.				GRAIN.	
Tablets ..	Unknown.	1	0·83	Tablets ..	India ..	8	1· 7
Do. ..	Do.	1	0·01	Do. ..	Germany.	5	5· 1
Do. ..	Do.	1	0·33	Do. ..	Do.	3	2·95
Do. ..	Do.	1	Trace.	Do. ..	Do.	3	3·00
Do. ..	Do.	2	1·20	Do. ..	England.	5	5·10
Do. ..	Do.	2	0·09	Do. ..	Do.	5	4·90
Do. ..	Do.	2	0 09	Do. ..	Do.	3	2·50
Do. ..	Do.	2	1·80	Do. ..	Unknown.	5	4·90
Do. ..	Do.	2	Trace.	Do. ..	Do.	5	4·82
Do. ..	Do.	3	0·40	Do. ..	Do.	5	4·78
Do. ..	Do.	3	2·94	Do. ..	India ..	5	4·01
Do. ..	Do.	3	0·01	Do ..	Germany.	5	4·49
Do. ..	Do.	5	0·33	Do. ..	Do.	5	4·58
Do. ..	Do.	5	4·84	Do. ..	Do.	2	1·81
Do. ..	Do.	5	1·45	Do. ..	Do.	5	4·51
Do. ..	Do.	5	1·87	Do. ..	Do.	5	4·00
Do. ..	Do.	5	2·15	Do. ..	England.	5	5·01
Do. ..	Do.	5	4·75	Do. ..	Do.	4	4·16
Do. ..	Do.	5	2·04	Do. ..	Do.	4	3·86
Do. ..	Do.	5	Trace.	Do. ..	Unknown	4	4·05
Do. ..	Do.	5	Do.	Do. ..	England.	5	4·60
Do. ..	Do.	5	4·96	Do. ..	Germany.	3	3 07
Do. ..	England..	5	4·80	Do. ..	India ..	1	0·98
Do. ..	Do.	5	4·93	Do. ..	Do. ..	4	Trace.
Do. ..	Do.	5	4·97	Do. ..	Do. ..	3	No trace.
Do ..	India .	3	2·67				

* Some analytical results on Quinine tablets submitted by the witnesses.

V*

Name of article.	Origin.	Results of analysis.	Remarks.
Bismuthi salicylas ..	Germany ..	Bi 203·66 per cent ..	Standard.
Bismuthi subnitras ..	India ..	A mixture of French chalk and kaolin.	This was labelled as Board Proceeding, with the name of a fictitious British firm "Made in England."
Calcii lactas	Germany ..	98·8 per cent hydrate calcii lactate.	Standard.
Coccus Cacti ..	Unknown.	Ash 34 per cent	Adulterated.
Extractum Belladonnæ viride.	Germany ..	Belladonna alkaloids 0·42 per cent.	Should contain about 1·0 per cent.
Extractum Belladonnæ viride "Special".	Do. ..	Belladonna alkaloids 0·01 per cent.	Do.
Extractum cascaræ sagradæ.	Do. ..	Tasteless	Normally very bitter.
Extractum cascaræ sagradæ liquidum.	England ..	Alcohol 11·7 per cent ..	Should be about 25 per cent.
Extractum Ipecacuanhæ liquidum.	Germany ..	Ipecacuanha alkaloids 0·92 per cent.	Should contain alkaloids 2·0 per cent.
		Alcohol 19·78 per cent ..	Alcohol 84·0 per cent.
Extractum nucis vomicæ.	Do. ..	Strychnine 2·5 per cent ..	Should contain 5·0 per cent.
Extractum taraxaci liquidum.	Do. ..	Alcohol 14·3 per cent ..	Should contain about 25·0 per cent.
Extractum viburni prunifolii liquidum.	England ..	Alcohol 13·1 per cent ..	Should contain about 62 per cent.
Ferri-et-quininæ citras.	Do. ..	Quinine alkaloid 4·22 per cent.	Should contain 15 per cent.
Ferri-et-quininæ citras.	Do. ..	Quinine alkaloid 4·5 per cent.	Do.
Gum Asafoetidæ ..	Unknown ..	Ash abnormally high and solubility in alcohol low.	....
Gum Myrrhæ ..	Do. ..	Mixed with ghatti gum ..	....
Iodoformum	India ..	Sulphur 95 per cent ..	This was packed in the bottle of a well-known British firm without changing the label.
Lactose	France ..	Lactose 60·9 per cent, balance maize starch.	....
Liq.-strychninæ hydrochloridi.	England ..	Alcohol 17·5 per cent ..	Should contain 22·5 per cent.
Linimentum belladonnæ methylatum.	Do. ..	Alkaloids 0·09 per cent ..	Should contain 0·2 per cent.
Linimentum potassii Iodidi cum sapone.	Do. ..	Potassium Iodide 7·3 per cent.	Should contain about 10 per cent.
Linimentum Terebinthinæ.	India ..	Turpentine 30 per cent ..	Should contain 65 per cent.
Oleum ajowan ..	Do. ..	Thymol 4 per cent ..	Should contain not less than 40 per cent.
Oleum anisi	France ..	Did not congeal at 0° C.	Should congeal at 15° C.
Oleum caryophylli ..	Do. ..	Eugenol nil	Should contain not less than 85 per cent.

* Results of analysis of samples as carried out under the direct control of the Committee. It is regretted that, owing to shortness of time, it was not possible to extend this list.

Name of article.	Origin.	Results of analysis.	Remarks.
Oleum copaibæ ..	India ..	A mixture of Gurjan oil and turpentine.	
Oleum cinnamomi ..	Germany ..	Specific gravity 0·979 ..	Should be sp. gr. 1·045.
Do. ..	Do. ..	Aldehydes 35·40 per cent.	1·063 aldehydes 55·65 per cent.
Oleum hydnocarpi ..	India ..	Contained 75 per cent Liquid paraffin.	....
Oleum Menthæ piperitæ.	Germany ..	Esters as menthyl acetate 2·8 per cent.	Should contain esters not less than 5 per cent.
		Menthol 10·1 per cent ..	Menthol not less than 50 per cent.
Potassii citras ..	India ..	No. 1 Potassium nitrate only.	Nos. 1 and 3 were packed as though imported and labelled with the name of a fictitious European firm. Nos. 2 and 4 had a Calcutta label on.
Do. ..	Do. ..	No. 2 Potassium citrate 21·6 per cent. Balance Potassium nitrate.	
Do. ..	Do. ..	No. 3 Potassium citrate 25 per cent; Potassium carbonate 5 per cent; Balance Potassium nitrate.	....
Do. ..	Do. ..	No. 4 Potassium citrate 9·8 per cent; Balance potassium nitrate.	....
Radix ipecacuanhæ ..	Germany ..	Consisted of the deemetinized powdered root.	....
Do. ..	India ..	A mixture of starch with inert vegetable matter.	....
Santoninum	Burma ..	Re-crystallized Boric acid.	....
Sodii bicarbonas ..	Unknown..	Contained 15 per cent sodium carbonate.	....
Sodii citras	India ..	Consisted of anhydrous .. Sodium carbonate ..	....
Do.	Do. ..	Sodium citrate 9·08, remainder sodium nitrate.	....
Syrupus aurantii ..	Do. ..	Alcohol nil	....
Syrupus Chlorali ..	England ..	Chloral Hydras 10·2 per cent.	Should contain 20 per cent.
Syrupus Ferri iodide.	Do. ..	Ferrous iodide 1·01 per cent	Should contain 5 per cent.
Do. ..	India ..	Ferrous iodide nil ..	Do.
Do. ..	England ..	Ferrous iodide 1·4 per cent	....
Tablets Quinine Bisulphate.	India ..	(1) Quinine absent ..	Labelled as—
		(2) Do. ..	1 gr. 2.
		(3) Do. ..	2 gr. 3.
			3 gr. 5.
Tinctura moschi ..	England ..	....	Labelled 'Fact' for factitious.
Unguentum Hydrargyri.	Do. ..	Mercury 13·7 per cent ..	Should contain 30 per cent.
Vinum ipecacuanhæ..	Germany..	Alkaloids 0·015 per cent not made with sherry.	Should contain 0·1 per cent.

APPENDIX E

Drug Control and Pharmacy *

The necessity of legislation to control the potency and purity of drugs and chemicals manufactured locally or imported from abroad is obvious as, of the 443 replies to question 4 of the questionnaire, only five are in the negative. The *noes* are from Bengal (2) and the United Provinces (3), and two of the witnesses have given the reason for their answer:—

(1) From Dr. C. C. Bose, Lucknow:—

"No—not till we are given self-government as any legislation is likely to be abused to its own advantage by a foreign Government."

(2) From B. S. Mozumdar, Secretary, Berhampur Medical Association:—

"No. On the other hand we feel that in the present stage of development of chemical and drug industry in this country, what is most essential is not a cramping and hampering legislation, but friendly and helpful advice. As regards drugs imported from abroad, it is unthinkable that in spite of strong controlling legislation already existing there, it can be possible for countries like Great Britain, United States of America, etc., to prepare drugs of lower potency and impure quality, as implied in question 4.

If such a thing is possible even now in those advanced scientific countries, it shows quite clearly the utter futility of any such legislation.

While admitting that there ought to be some legislation Sundari Mohan Das of Calcutta thinks that this is not the proper time for it.

Others (9) favour legislation (*a*) on condition that the control is exercised by a department consisting of Indians (1), (*b*) only after the more important subject of the adulteration of foodstuffs has been adequately dealt with (1), (*c*) not before an Indian Pharmacopœia has been prepared (4) and (*d*) provided particular regard is shown to the nascent chemical and pharmaceutical industries in the country (3) or, in the words of Rao Sahib T. S. Tirumurti, Professor, Medical College, Vizagapatam:—

"Legislation to control the potency and purity of therapeutic substances is of course desirable but in this country *legislation to protect the local manufacturers of drugs and chemicals from outside competition should precede the former legislation.*

I am of opinion that legislation for both purposes can be judiciously combined, so that this nascent industry for the preparation of drugs, chemicals and biological products of the Allopathic system of medicine may not be killed by unfair foreign competition."

The general consensus (421), however, is in favour of immediate legislation. The suggestions are many.

Of the 501 answers to question 5 of the questionnaire as to the desirability of control of therapeutic agents, on the lines enacted in such countries as Great Britain, United States of America, etc., in this country only 13 are in the negative.

The *noes* are from Burma, Bengal (5), Nepal (2), the Central Provinces, the United Provinces (2), the North-West Frontier Province, and Bombay. The reason alleged may be expressed in the words of Dr. S. C. Sen Gupta, Professor of Medicine, National Medical Institute, Calcutta:—"Not yet. Time has not come for any enactment. So long as the Government is not in a position to help local industry it should not attempt restriction at this stage of development."

The same idea underlies those answers (3) which favour some sort of legislation, but "not such as to adversely affect the young growing industries of India".

Some (39) are of opinion that the control ought to be so modified as to suit Indian conditions, or (8) that it should be preceded by the compilation of an Indian Pharmacopœia.

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* Summary with reference to answers and memoranda. See also extracts set out in Appendices B and C. The numbers within brackets represent the number of those who gave the answers.

J. C. GHOSH, B.SC. (Manchester), F.C.S., Calcutta, writes:—

"The American system of control seems preferable, but, having regard to India's tradition, custom and poverty, less drastic measures may be adopted. A licence fee, a declaration of formulæ in all cases and liability to examination of contents, whenever necessary, would set up a system of salutary control."

From Lt.-Col. C. H. Smith, I.M.S., Legation Surgeon, Nepal:—

"This is a question rather beyond me. More legislation means more taxes, etc. My experience is that if you deal with good *English* firms you get good drugs.

"All this idea of control appears to me to be perfectly absurd when there are thousands of vaids, hakims, etc., practising who make up their own medicines over which there is no control."

On the other hand A. C. Ukil, M.B., M.S.P.E. (Paris), Professor of Bacteriology, National Medical Institute, Calcutta, strongly emphasizes the need for legislation:—

"Yes, legislative action to control the potency and purity of drugs imported from abroad or locally manufactured has long been overdue. India imports nearly Rs. 3 crores worth of medicines and now manufactures a large quantity of sera, vaccines, glandular products, tinctures and alkaloids. We do not know in India to-day how far under-strength medicines are imported, how far the climate is responsible for the deterioration of these drugs and how far locally manufactured products conform to a certain standard. There is no machinery of control organized either by the State or by the manufacturing firms or by the suppliers of raw products.

"Some of the more commonly used medicines in the indigenous system have been scientifically studied by pharmacologists and chemists, some have already been incorporated into the British Pharmacopœia, others are worth such incorporation. A large proportion of the population resort to treatment by Allopathic and Ayurvedic medicines. A time has come for a standardization and legal control over a question affecting the health of millions in this country."

In the words of Dr. U. Rama Rao of Madras:—

"In my opinion legislation is absolutely necessary. The import and manufacture of drugs and chemicals, the purity and strength of which are not up to the standard, must be penalized. Now the difficulty arises in determining the culprit in the case of imported articles. It may be that the manufacturer sends, of his own accord and on his own responsibility, drugs and chemicals of inferior standard and quality and the wholesale dealer in India unknowingly accepts it and innocently passes it off as superior stuff. Or it may be that the dealers in India, greedy of more profit, expressly indent for and obtain inferior stuff with the B.P. label affixed to the packages, at less cost and put them for sale in the market at a higher price. The foreign exporter is the fountain head of mischief in either case and he must be prevented from sending drugs and chemicals of inferior quality and he must always be penalized either as an original offender or as an accomplice. It goes without saying that in the latter case, the Indian dealer is also punishable."

According to Captain P. De, B.SC., M.B., M.R.C.P., Officiating Professor of Pharmacology, School of Tropical Medicine and Hygiene, Calcutta:—

"Probably a major portion of the drugs and chemicals used in British India are imported from foreign countries and, as there is no law to prevent importation of drugs of doubtful and questionable value, there is absolutely no check on manufacturers abroad to put some of their inferior stuff into India.

"Apart from the possibility of drugs of defective strength and impure quality being put into the Indian market, there are some preparations, which though sent out in a perfect condition, might be deteriorated due to transit and long storage in the humid climate of India. This aspect of the question should not be lost sight of in consideration of drugs of impure quality. Biological products like sera, vaccines, gland substances, etc., are also likely to be affected due to long storage.

"The necessity for some control on the drugs at present in the market is clear. The enquiry instituted by the Government of India is, I feel, a step in the right direction and everybody who has got the good of the public at heart, will join hands in this laudable attempt on the part of the authorities to help the consumers and if some legislation is brought into force it will certainly be welcome. It will be of immense benefit to the members of the medical profession who will be in a position to prescribe drugs with a degree of confidence and certainty. The manufacturers, who intend to do business honestly, will be assured of a good market and unhealthy competition will be weeded out. The consumer will get pure drugs which will be worth the money he spends. All civilized countries have got some sort of legislation to this effect. India should not lag behind in taking such steps as would ensure the purity of drugs and chemicals and thereby maintaining the health of her teeming millions."

To quote Dr. D. A. D'Monte, M.D., L.R.C.P., F.C.P.S., Bombay:—

"From the report of H.M. Senior Trade Commissioner for India and Ceylon for the year 1928-29, that more than 40 per cent of imports of drugs come from the United Kingdom. Although a sale of Foods and Drugs Act does exist in the United Kingdom, it is unfortunate that no Act is made applicable to exports of drugs from there to India and elsewhere; the result is that there is no surety that all the drugs, etc., imported into India from the United Kingdom have the same purity of composition and standard as for drugs used in that country under the sale of Food and Drugs Act. There are certain foreign firms which are specialized in the export of drugs especially manufactured for India and other Eastern countries, and as some of these firms do not care to send articles of standard quality, but with a view to sell them at competitive rates, the effect produced on the articles of local manufacture is bound to be dangerous, as they cannot be always of standard quality, if they have to compete against articles of cheap quality and packing dumped into the country. In view of the above and in the interest of the public as well as of maintaining a high standard of quality in the drugs manufactured locally, it is highly essential to have an effective control to prohibit the import of drugs that are below the standard of purity and composition laid down for such drugs in the country of origin. I am therefore of opinion that both in the interests of the public as well as the profession an Act is necessary to control the quality and strength of drugs, etc., similar to that in the United States of America. I am also of opinion that, for the effective control of drugs, chemicals, etc., either imported into this country or manufactured locally, there should be laboratories in important centres for the testing of drugs, etc., and, as Bombay is the chief centre of import of drugs, the central laboratory ought to be in Bombay and the branch laboratories at some other important centres such as Madras, Calcutta, etc., and that they should be in charge of experts in chemical analysis as well as in bio-chemical methods of testing drugs. In regard to the pure drugs Act for India, I am of opinion that it should be one which will have a complete control over the importation, manufacture and sale of drugs."

To meet this situation Lt.-Col. L. Cook, I.M.S., Civil Surgeon, Bhagalpur suggests:—

"And this leads me to offer the suggestion that if any legislation is required, it is that the drugs supplied to all local dispensaries and charitable institutions should be purchased from recognized firms, which firms should not be permitted to stock, let alone sell, any drugs which are not according to the standards of the British Pharmacopœia or indigenous drugs of approved value and standardizations.

"This would ensure that if all dispensaries only stock medicines of an approved standard the poor people will have the opportunity of obtaining good drugs even if they prefer to go elsewhere for better medical advice and more water.

"Such firms would be liable to inspection from time to time by Government experts.

"The obvious pit-fall to such a proceeding is that unless all district boards throughout the country co-operate in the movement, you would only penalize firms of good repute.

"You are here up against the L.S.G. Act which allows district boards to do what they please and it seems to me that only a general Medical Council in India could settle such a matter on these lines."

The Residency Surgeon, Indore State, recommends that—

"There should be a definite standard of purity and drugs should be tested both at the seat of production, or in the case of imported drugs before admission into the country, and in the course of retail. Adequate steps should be taken that drugs are used or destroyed before deterioration. Now they are sold and resold so that those for sale in many of the up-country shops are useless or dangerous."

Dr. Phani Bhusan Mukerji, B.SC., M.B., F.R.C.S., Lecturer in Radiology, Prince of Wales Medical College, Patna, offers the following suggestion:—

"The legislation should provide that the drugs or chemicals imported into India from abroad must come with at least four certificates as mentioned below:—

(1) A certificate of guarantee of purity and strength signed by any legally constituted and competent authority of the country of origin of the drugs.

(2) A certificate stating that the drug or chemical exported is saleable in the country of its origin.

(3) A certificate stating that the date of manufacture as mentioned in the label is genuine.

(4) A certificate assuring that the potency and purity of the drug or chemical satisfy the standards laid down in the Pure Drugs Act of the country of origin. These certificates will furnish the guarantee that no drug or chemical is being introduced into India which could not be released for sale in its country of origin."

And Dr. S. C. Das, M.B., Lecturer in Pharmacology and Materia Medica, Robertson Medical School, Nagpur:—

"(i) All importers should be licensed and registered. They should give full details of all imported drugs and their manufacturers and middlemen.

"(ii) Each batch of such imported articles must be accompanied by a certificate of purity and potency specified by the pharmacopœia for India from an authority to be recognized as competent by the central controlling body.

"(iii) In cases of consignment accompanied by certificates not regarded as competent, they should not be released for sale until each batch of it be certified by a recognized competent authority at the cost of the importer.

"(iv) There should be occasional testing of samples to check the reliability of certificates."

From Dr. R. M. Fozdar, Medical School, Ahmedabad:—

"I would suggest, to ensure purity of drugs and chemicals, that uncertified vendors should not be permitted to sell their articles loose, but in original packages and containers. Considering that India is a tropical country, drugs and chemicals often deteriorate in this climate. I would suggest that all such articles should have their dates of manufacture labelled on them by authorities. This difficulty is noticed even with products of reputed manufacturers. We do not know how long these preparations are lying with the stockists or retailers. I have often noticed that colloid preparations, even of Crooke's are not what they ought to be, if they were fresh."

It is clear, however, that merely preventing the foreign exporter from sending drugs and chemicals of inferior quality is not sufficient guarantee that the preparations offered for sale in India will be of the standard strength and purity. It is only transmitting the responsibility from one person to another. To further safeguard the interests of the ultimate buyer other steps need be taken. For example, as pointed out by Rai Harinath Ghosh Bahadur, M.D., Calcutta:—

"All drug houses where prescriptions of qualified doctors can be served and from where the public can make purchase either wholesale or retail should be licensed for a small annual amount."

As expressed by Lt.-Col. C. C. Murison, I.M.S., Officiating D.D.M.S., E.C., Naini Tal:—

"All chemists who sell drugs, druggists, dispensers, compounders and other persons, who deal in drugs, including those employed by the Government, municipalities, local boards and other public institutions should be

properly trained, qualified, and registered under legislation. The present system of employing untrained persons with very limited education in these capacities is absolutely dangerous to the public. This needs very early legislation."

Dr. Frank Noronha, M.B., C.M., D.P.M., Superintendent, Mental Hospital, Bangalore, holds the same view:—

"The vendors of drugs and chemicals must be duly licensed. Now-a-days any medical requisite is obtainable in a grocer's shop. They sell them cheaper than the chemists and druggists. The chemists thus require protection. The status of the chemist should also be improved

(1) By licensing the chemist himself who should be duly qualified for the job.

(2) By preventing unlicensed general traders to deal in medical requisites.

(3) A course of training for chemists and druggists should be instituted in every medical school and certified chemists should be the rule rather than the exception.

(4) Rules should be framed for the conduct of the business by the chemist, for the appointment of trained compounders and for the inspection of his stock by a competent authority. The legislation in this respect had better be undertaken by Provincial Governments according to the requirements of each province. There cannot be any doubt that legislation along this line is urgently required."

The Chief Medical and Sanitary Officer, Ernakulam, says:—

"The pharmacy shops in Indian towns have increased to an enormous number and the dispensing of drugs and prescriptions have passed into the hands of unqualified persons. Even passed compounders are so unreliable on account of the inferior training they get and the superficial examination they have to pass that they cannot be depended upon as good dispensers of medicines. The pay offered to them is so small that there is no incentive for people to go for higher qualification. Fifty years ago the dispensing was in the hands of men who have undergone a medical college course of chemistry, materia medica and practical pharmacy. Now it is entirely in the hands of men who have put in a period of indifferent training. I think that the standard of examination of compounders should be raised and licence to dispense medicine granted to only well qualified men."

The general aspect of the question is thus presented by Dr. A. S. Pranjpye, Department of Pharmacology, Seth Govardhandas Sunderdas Medical College, Parel, Bombay:—

"A legislation is necessary not only to control the potency and purity of drugs and the manufacture and sale of harmful products (on the lines of Food and Drugs Act, Therapeutic Products Act or Poisonous Drugs Act), but some laws like the Pharmacy Acts are also necessary to keep the import or manufacture and sale of drugs as well as the dispensing in qualified and responsible hands. The dispensing or the sale by unqualified persons, at least of some scheduled drugs and preparations, and also the supply of such scheduled drugs without a prescription by a qualified person must be punishable by law. It may not be possible to enforce this in all places at once, but the Act may be made applicable to certain places and extended by notification from time to time, to begin with the large cities and their suburbs. For this purpose it will also be necessary to fix certain requirements and institute courses and examinations which would lead to such qualifications. Certain substances ought to be supplied or dispensed only on a prescription of a registered medical practitioner. It will also be necessary to fix or create a minimum qualification for pharmacists and a separate one for dispensers or compounders. I am not aware of the exact provisions of the pharmacy Acts in Great Britain and United States of America, but they will be available to the Committee for making recommendations. I hope the Committee will also work out a scheme for the training of Pharmacists and Compounders with suggestions as to the standard of preliminary general education as well as the period and plan of studies in both cases. As far as I am aware, the only place where there is some sort of a pharmacy or chemists' and druggists' course in India is the Madras Medical College. It is a two years' course, as against four or five years' course in Europe and

America. A good compromise would be a three years' course, after matriculation examination, with science as an optional subject, for the pharmacists leading to a university licence (L.Ph. or L.Ph.C.) to which later on, as the profession developes in this country, a degree like B. Pharm. (as of London) can be superadded. Such a pharmacist's course will not only be a protection to the public but will tend to help the pharmaceutical industry of the country by transferring the business in pharmaceuticals from unqualified hands to the qualified and educated people and relieving the latter from unfair competition. For the compounders, a two years' course after the middle school examination would be suitable. Such courses can be given partly at science colleges and partly at medical colleges and large hospitals."

And Dr. D. A. D'Monte, M.D., L.R.C.P., F.C.P.S., Bombay:—

"I may point out that, so far as I understand, there are not more than half a dozen qualified chemists and druggists in a big city like Bombay, and consequently, the trade is entirely in the hands of certain traders or merchants, who practically know nothing about the drugs and poisons they sell, except the price. The guarantee they give is only the label marked 'B.P.' by the manufacturers, who stamp even adulterated drugs with the same label. I do not wish to inflict unnecessary hardship on the so-called chemists and druggists of to-day, but would like to recommend that, as soon as a College of Pharmacy is established, and trained diplomates are turned out in sufficient numbers, it should be made obligatory for every individual or firm trading under the designation of chemists and druggists to employ a trained pharmacist in his or their shop. Our young men who are presently unemployed will get employment, and both the public and the profession will thus be protected against the dangers of unqualified persons dispensing the adulterated drugs or medicines without having any knowledge or responsibility. I am therefore of firm opinion that the training of pharmacists and the pharmaceutical chemists is thus an essential factor in assuring the supply of pure drugs to the public. I, therefore, urge the immediate establishment of a college of pharmacy in Bombay which is the most convenient centre in many respects than any other.

"As regards instructions in pharmaceutical chemistry, I am of opinion that such a course could well be started at the Royal Institute of Science, Bombay, and also at the National Medical College. The University of Bombay have already moved in the matter of imparting instruction in chemical technology, and it is also suggested that provision for instruction in pharmaceutical chemistry should be included in the proposed scheme for chemical technology."

The establishment of a College of Pharmacy is a proposal which finds favour with the greater number of the witnesses. Rao Sahib T. S. Tirumurti, B.A., M.B., C.M., D.T.M. & H., Professor, Medical College, Vizagapatam, writes:—

"I strongly urge the *Institution of Chairs in Pharmacology and Experimental Pharmacology* in every Medical College in India and *strengthening of the Chemical Departments* of these institutions. Facilities should be given for the clinical testing of the drugs under investigation in the hospitals which are attached to these Medical Colleges. *Also a Diploma in Dispensing* and a *Degree in Pharmacy and Pharmaceutical Chemistry* should be instituted in the older Universities of India."

And Dr. P. M. Nanavati, L.M.S., D.T.M. & H., Acting Chief Medical Officer, Baroda State:—

"I do not think there can be two opinions on the desirability of restricting the profession of pharmacy to qualified persons. But I am of the opinion that before this restriction is enforced there must be a sufficient number of qualified and trained men to take up this business.

"India with her poverty can ill-afford to send her sons to foreign countries for being qualified for this work at an enormous cost, and therefore, in the interests of economy and convenience, two or three colleges of pharmacy should be started immediately. They should be manned by experts. The starting of these Colleges will afford facilities for training and will also encourage research which should make possible the utilization of the vast raw products of the country.

"The functions of the College should be:—

(1) To train pharmacists.
(2) To train them in research work.
(3) To teach the manufacture of biological products and methods of their standardization.
(4) To provide facilities for training as compounders and dispensers."

Dr. Phani Bhusan Mukerji, B.SC., M.B., F.R.C.S., Lecturer in Radiology, Prince of Wales Medical College, Patna:—

"The Committee should recommend that a College of Pharmacy should be established at a very early date where training should be given in pharmaceutical and analytical chemistry; methods of extraction of active principles out of raw materials, methods of biological and pharmacological assay, standardization, cultivation of medicinal plants, proper harvesting of same, etc. This College should grant a Diploma in Pharmaceutical Chemistry and the Universities in India may be requested to open up similar courses and institute degrees in the same subject. Once a start is given and young men of the country are trained in the methods of pharmaceutical research and industry—the drug problem of the country will be solved in no time.

"In my opinion unless these two matters are taken up simultaneously, the Chief object of the Committee will not be attained, viz., provision of pure drugs to the suffering public at a cost suitable to their purse."

And the Acting Chemical Examiner, Madras:—

"I have been a member of the Pharmacy Board examining candidates for the Diploma of Chemists and Druggists for about 15 years. I am convinced that only those who have passed the School Final examination of this Province taking chemistry and physics as their optional subjects are fit to be admitted to the courses of these studies. They should also be made to attend a course of lectures and demonstrations in pharmacology. They should on no account be given exemption from general qualifications (a pass in School Final examination) as candidates given exemption will not be able to follow the lectures in chemistry nor to understand and do the practical work."

But, unless the present state of things is modified, it is doubtful, according to Dr. A. Lakshmanaswami Mudaliyar, B.A., M.D., Madras, whether the profession of pharmacy will ever attract candidates in any numbers.

Dr. T. K. Venkatarama Ayyar, M.B., B.S., Medical Practitioner, Karur, tells us what he considers is the reason why chemists and druggists in Madras do not come unto their own, and concludes:—

"To remedy this state of affairs, out of very intimate acquaintance with the local conditions for six years and after spending much time and thought over this question, I have come to the following definite conclusions:—

"(1) No Government, however rich it may be (much less a poor country like India), can afford to give free medical treatment to all its subjects. So, State medical charity should be restricted to the deserving poor.

"(2) From the above, it necessarily follows that State medical institutions and State paid officers can reach only a fraction of the population in the country. The rest are served by the independent medical profession which has by its peculiar situation to do a great deal of medical charity work besides. The main obstacle to the growth of a strong independent medical profession in this country is the *unhealthy, unequal and unfair competition between* the State-paid officers and themselves. So, without putting a stop to this by depriving the State medical men of private practice, you cannot have a strong and efficient independent medical profession in the country and *without an independent medical profession, you cannot have a profession of qualified chemists.* So, in my opinion, the scope of enquiry of this Committee has got to extend also to the present state of the medical profession in the country. Colonel Megaw, ex-Surgeon-General with the Government of Madras and now Director-General of the Indian Medical Service, found, on a casual examination of the stock quinine mixtures in the State hospitals, that many of them do not contain the amount of quinine stated in the label. Need it be doubted that this is due to the fact that the

supply of quinine is being reserved by the medical officers for their cases. When State-paid officers do like that, is it any wonder that the poor private practitioner who has to spend money from his pocket is not honest in dispensing, at least when the State itself throws obstacles in his earning an honest food for his professional service?

"(3) So, if the State wants to protect its sick patients and see that they get honest dispensing, the profession of pharmacy should be restricted to duly qualified persons and if the profession of pharmacy should thrive, there must be a strong independent profession and if this, in turn, should thrive, the obstacles that stand in its way should be removed. So, in my opinion, the reformation of the existing order of things should proceed in the following order:—

(*a*) Restrict admission into State hospitals, both out-patient and in-patient, to really poor people and emergency cases.

(*b*) Debar State-paid officers from private practice.

(*c*) Extend the system of honorary medical officers to all hospitals in the State as in the West.

(*d*) Have well-known medical men in the locality to serve as honorary officers in the visiting staff and have special wards in all hospitals where they can treat their private patients.

(*e*) Restrict the profession of pharmacy to duly qualified chemists who must maintain registers, copies of prescriptions, etc. (the details of these have got to be worked out) and penalise their independent dispensing. Their honesty must be supervised by a State 'Inspector of qualified Chemists.'"

Messrs. Smith, Stanistreet & Co., Limited, Manufacturing Chemists, Calcutta, opine that the changes ought to be introduced gradually without any precipitation:—

"In order to make a Pure Drugs Act a possible proposition some form of licensing and registration of drug dealers is absolutely essential. The qualification at the beginning should be made as low as possible, but some knowledge of drugs and some general education must be insisted upon. It should also be enacted definitely that within a short time (say five years) a qualification at least as good as the Campbell examination for compounders should be compulsory for all medicine and drug dealers, and it should be made illegal for kabirajs and others to sell pharmacopœial preparations unless they are in possession of the qualification. Those who are able to show this higher qualification on the passing of the Act could be at once put on the higher grade as 'first class dealers' and those who could not (which would be the great majority) would be graded as 'second class' or some such appellation. This would be an inducement to qualify.

"Some arrangement of this nature would be necessary; otherwise, the public would be inconvenienced if the qualification were made too high immediately, and yet it is useless to make it too low. It might also be necessary to have some modified test for those who could prove they had been in regular drug dealing business for (say) ten years before the passing of the Act. Repeated infringement of the Pure Drugs Act should involve cancellation of Licence."

This naturally raises the question: 'Are compounders qualified?'

The replies (101) * show that dispensing in India is far from satisfactory, as many as 51·8 per cent of the witnesses having reason to find fault with compounding. The complaints are naturally more numerous in those provinces where the compounder has little or no training; in Punjab 67·5, in Calcutta 66·0, and in the United Provinces 60·2 per cent of the practitioners have had bitter experience of bad dispensing.

Dr. H. Sahai, King George Medical College, Lucknow, writes:—

"The examples of inaccurate dispensing are very common and one does not feel surprised when every man with a little capital thinks of becoming a chemist, druggist and a dispenser to make his fortune. Some of the dispensers and compounders can hardly read a fairly well written prescription and the mistakes like reading Ext. Belladonna Liq. as Ext. Balea Liq.,

* To question 10 of the Questionnaire about inaccurate dispensing.

with unfortunate results are not infrequent. A definite standard of training for the qualification of compounders should be insisted upon and none without the possession of a recognized certificate should be allowed to act as a compounder in hospitals or private dispensaries."

And the Head of the Department of Pharmacology, King George Medical College, Lucknow:—

"Inaccurate dispensing is a common experience and is due to the employment of ill-trained and incompetent compounders and dispensers both in dispensaries and at the chemists' shops. Check over inaccurate dispensing can only be exercised by insisting upon employment of trained compounders and dispensers both in dispensaries and chemists' shops. For this purpose a diploma in dispensing and compounding is necessary and the employment of these trained compounders will have to be insisted upon both in the Government and private hospitals as well as in the chemists' shops. I consider legislation under this head is of more immediate importance than the one in question."

From the Civil Surgeon, Singhbhum:—

"In many cases, the compounders are very careless and negligent. It is risky to depend on them for making solutions of potent drugs according to strength for intravenous injections, many accidents having occurred in such cases. It has been noticed that even making provincial pharmacopœial preparations the mixtures have not the prescribed constituents or proper strength as they do not generally take the trouble of measuring the same and specially in weighing the solid drugs. Pot. iodide mixture has not been found to contain the required ingredients, so also quinine mixture containing ten grains of quinine. I have detected once pure water having been supplied on a prescription of quinine mixture. (The compounder of course was punished with dismissal in this case.) Having all these in consideration strychnine has been changed for tincture nux vomica in the ferri-et-strychnine mixture as, due to such carelessness and negligence on the part of the compounders, it may turn fatal."

From the Civil Surgeon, Monghyr:—

"Generally due to the substitution or omission of drugs which have run short or are not stocked. Wilful cheating is not so frequent. The general lack of education of the compounders is also a danger."

Wilful cheating, however, is reported from the Madras Presidency where compounders go through a regular course of training.

Major-General C. A. Sprawson, I.M.S., Surgeon-General with the Government of Madras, says that inaccurate dispensing is 'sometimes due to bad spelling or inaccuracy of the doctor, usually due to ignorance or dishonesty of the compounders'.

Dr. K. Venkatachalam Pillai, Acting Professor of Pharmacology, Medical College, Madras:—

"Inaccurate dispensing is brought to light generally, only when toxic symptoms develop as a result of the addition, in dispensing or excess of the ingredients prescribed. Dispensing of less than the prescribed quantities of rare and costly drugs is common practice in some quarters, as has recently been proved, by examining test prescriptions containing quinine, potassium iodide, etc. These defects may be due either to careless or ignorant dispensing or to deliberate neglect, and may be remedied by insisting on the employment of qualified chemists and druggists in the dispensing houses and by creating investigation laboratories for testing the standard and efficacy of drugs sold in the dispensaries and drug houses."

And Dr. P. Krishnaswami, Superintendent, King George's Hospital, Vizagapatam:—

"Quinine poisoning by over-dosage; croton oil was put into a patient's eye instead of atropine, due to wrong label; wilful tampering of doctor's prescriptions by compounders in small hospitals out of spite or greed"

From the Civil Surgeon, Allahabad:—

"Considering his education, etc., the Indian compounder is remarkably reliable except when he is covering thefts of drugs which is all too common."

From William Cotton & Co., Simla:—

"A conscience is the 'sine qua non' in those who deal in and dispense medicine; without this, in our opinion, any legislation will be futile. The Government however can hardly be expected to provide consciences."

And from C. Bhan & Co., Chemists, Retail and Wholesale Druggists, Ludhiana:—

"The purity of drugs always depends on the purity of the man dispensing the drug and no legislative restriction can make a man pure, and it will take long time to make men moral. We suggest that the chemists and druggists should be registered, and hope this status will bring them together, and will have some controlling effect. We mean that men in this line should be taught morals, as we have very little faith in the legislative measures to make men moral, and with the present state of society, with love of money on one side and corruption on the other, no good will come out to the benefit of suffering humanity."

The demand for the training of a better type of compounders is almost universal. Dr. D. A. D'Monte, M.D., L.R.C.P., F.C.P.S., Bombay, says:—

"The Government have not made as yet any systematic provision for the proper training, examination, certification and registration of compounders or dispensers on the plea of financial stringency. I strongly opine that adequate provision should be made without further delay for the training, examination, certification and registration of compounders in every province."

Dr. S. C. Das, M.B., Lecturer in Pharmacology and Materia Medica, Robertson Medical School, Nagpur:—

"Inaccurate dispensing is not unusual. For ensuring better dispensing—

(i) All firms dispensing prescriptions of doctors in general should be registered.

(ii) All such dispensaries should be in charge of one or more qualified compounders who should take on themselves the responsibility of all the prescriptions served.

(iii) Each bottle or packet of medicine dispensed should contain, on its label, the signature of the qualified compounder responsible for its dispensing.

"Training of compounders should be improved and if possible made uniform throughout India. They should have a course of not less than 18 months of which at least 12 months should be meant for Materia Medica and Pharmacy, with special stress on the subject of incompatibility. They should be taught a little of elementary physiology and bare outlines in the treatment of important diseases."

Dr. J. H. Rizvi of King's English Hospital, Lucknow:—

"(1) Only trained compounders should be employed in dispensing.

(2) The standard of a *general* chemists' shop should be raised and the shops should be subjected to frequent examinations by experts, unless it be privately owned by a practitioner. Small shops should be closed.

(3) Adequate punishment in the form of heavy fines should be given for any gross negligence in dispensing.

(4) An age limit should be given to all B.P. preparations after which they should be thrown away if unused."

Dr. C. P. Chaube, M.B.B.S., Delhi:—

"It is chiefly due to lack of facilities for training compounders. Until we made adequate provision for this, the blame lies on our own shoulders rather than those of others. It is suggested that such compounders as can produce certificates of having worked uninterruptedly for two years under a registered practitioner, should be allowed an annual examination in three

grades. The papers must be the same all over India. The examination must be conducted in hospitals having a medical officer equivalent to a civil surgeon. These officers will personally supervise and scrutinize the tests, and make recommendations for the issue of certificates to a central board. They may obtain any desired assistance from their subordinates in the scrutiny, as the candidates must be given option to answer in their own script, the paper being always issued in English. The entrance fee for this examination must be kept low, and the setters and examiners be expected to do this public work honorarily, the revenues collected being spread out to cover printing, stationery, and the upkeep of a small central staff of clerks."

Dr. V. K. Parulkar, L.M.S., Bombay:—

"I wish to give my opinion as regards the training of compounders. It is necessary that medical men should have trained compounders. I do not however believe in opening a special school for teaching them. Any one who is above sixteen years of age and knows how to read and speak English language can, in my opinion, be trained for compounder's work. In India people coming from Goa, especially Christians, know how to speak and write English. It is not necessary that they should pass any University Examination for joining the course prescribed for trained compounders. Candidates who have passed the School-Leaving Certificate examination should also be admitted. Boys who have not passed the School-Leaving Certificate examination but have studied up to that standard should be examined by the medical officers to see whether they are able to speak English by oral examination and by making them write some easy passage from some text book which should be dictated to them. I make this suggestion because it is quite likely that the candidate might have passed in English and failed in another subject which is not urgently necessary for the training of compounders such as history, etc. Up to now almost all compounders working in hospitals, private dispensaries and with druggists and chemists have passed no test examination of any kind and are doing this work nicely. I do not mean to say that there have been no mistakes in their work but from insufficient evidence it is not right to condemn compounders as a class wholesale. The mistakes are not due to want of University education but to their not teaching them proper doses of poisonous drugs and such details as are necessary in compounding. In my opinion, therefore, it will be better to make them study the art of compounding in dispensaries attached to hospitals and charitable dispensaries. Private dispensaries can also be used to train compounders when there is necessity of doing so, owing to there being want of accommodation for all of them. In the hospitals and dispensaries, they will naturally be able to read the names of the drugs and the doses. They will also know what drugs are poisonous from the labels of '*poison*' on the bottles kept in a separate cabinet with glass doors under lock and key. It is not possible to write here fully what syllabus should be fixed for training of compounders; this could easily be done when it will be necessary to do so.

"Examination of compounders should not be a written one. Oral examination as regards doses, etc., reading of prescriptions, compounding of mixtures and pills, etc., in my opinion will be enough. Would-be-compounders who have satisfied the test should be granted certificates which would qualify them for compounder's work. The suggestions made will save the expense of starting schools, appointing paid staff, etc. Compounders will get practical knowledge which is essential. There would be compounders who could be used as assistants by compounders in charge."

Lieut.-Col. J. L. Sen, M.C., I.M.S., Civil Surgeon, Cachar:—

"It is vital for the successful treatment that the purity of medicine be very rigidly enforced by legislation. One of the most difficult problems is to fight against the inaccurate dispensing. There should be some sort of agency by which inaccurate dispensers are detected and criminally prosecuted."

In justice, however, to compounders and dispensing chemists, those concerned ought not to lose sight of the special difficulties in the way of the profession. For instance, A. Kitchner & Co., Chemists, Saharanpur, call our attention to the fact that—

"Some qualified doctors prescribe certain drugs under a name which is not given in the British or any other pharmacopœia but it is a name understood by certain chemists to whom the doctor in question wants to dispense his prescription. The name is not understood by other chemists

or doctors and consequently that particular prescription cannot be dispensed anywhere else. This is a very unfair proceeding and drugs should be prescribed under their proper names as given in the British or other pharmacopœias."

Capt. P. De, B.SC., M.B., M.R.C.P., Officiating Professor of Pharmacology, School of Tropical Medicine and Hygiene, Calcutta:—

"The profession of pharmacy should be restricted to duly qualified persons. Though I am not aware of cases of gross errors in dispensing, it is only legitimate to expect these incidents if the dispensers are not fully qualified in their art and not imbued with the responsibility that naturally attaches to their profession. In Bengal there is already an examination for the compounders under the State Medical Faculty and I think the minimum basic qualification should be the Matriculation of the Calcutta University so that they can grasp the teaching in chemistry and pharmacy which are essential to a compounder. Furthermore, in view of the fact that the drug industry in India is still in its infancy, some attempt should be made to give more elaborate training in pharmaceutical chemistry. In highly civilized countries like England and America the University has a separate chair on pharmaceutical chemistry and students are systematically taught in this particular subject. Degrees and diplomas are awarded and on the strength of these people are recruited into Government and public appointments. If such a thing is instituted in the Indian Universities a new avenue will be open to educated young men who can take up drug manufacture as their profession, and country will also be benefited in the long run through their efforts and endeavour."

Inspection of shops is favoured by many. Major B. Sahai, I.M.S., Kohat district, says:—

"If possible some control should be exercised over the firms of chemists and druggists in general to ensure a correct and regular turn over of their stock. Cases are not wanting in which one has prescribed a preparation manufactured by a firm of unquestionable reputation but the article supplied has shown visible and tangible signs of age. Similarly the storage of stock, sera and vaccines by firms during the hot weather calls for some measure of supervision."

The Professor of Materia Medica, Grant Medical College, Bombay:

"There ought to be a body under Government control to pay surprise visits to the chemists' shops and get the drugs analysed for adulteration and B P. strength, such a body being empowered to prosecute under the law, the offence being punishable by fines and imprisonments when necessary."

Dr. Phani Bhusan Mukerji, B.SC., M.B., F.R.C.S., Lecturer in Radiology, Prince of Wales Medical College, Patna:—

"The proposed legislative measure should also provide for the appointment of a certain class of officers by local Governments whose duty it will be to visit periodically the chemists' and druggists' shops (wholesale as well as retail shops) and inspect their stock. They should have powers to pick out bottles whose contents they may suspect to be impure or of inferior strength and send them to the provincial laboratories for testing and assay. The Civil Surgeons of the districts may have this power given to them. This system will provide a check against stockage of drugs of unsatisfactory quality and strength by the chemists and druggists."

And Dr. M. L. Pillai, Lucknow:—

"Druggists' and chemists' shop should be periodically inspected and licensed. Formerly the Civil Surgeon used to pay surprise visits to these firms. The custom has now fallen into disuse. It should be revived in some form. I would suggest the creation of a provincial expert, not less than the rank of a Civil Surgeon, whose duty it should be to visit every district once every six months. He may be assisted in his work by district medical authorities."

In conclusion, says Dr. K. S. Mhaskar, M.D., Haffkine Institute, Bombay:—

"A Pharmacy Act seems also necessary to keep the manufacture and sale of drugs, as well as dispensing, in the hands of qualified and registered persons."

The Medical Superintendent, Arthur Road and Maratha Hospitals, Bombay:—

"There should be a pharmaceutical society established and all the drugs and preparations, dispensing, etc., should be regulated throughout the country, through it.

"None but a certified chemist by the society or a medical man should be allowed to have connexion with the sale or dispensing of the drugs."

Dr. A. C. Sen, L.M.S., Delhi:—

"Legal enactment is required for creating a council of pharmaceutical society and appointing public analysts. Examinations for pharmaceutical and dispensing chemists and dispensers would be conducted by them and separate registers kept."

As shown elsewhere the control of patent medicines in India is of paramount importance.

A. J. Walmsby, Manager, The Planters' Stores and Agency Co., Limited, Dibrugarh:—

"A standard work, similar to the B.P. Codex, should be compiled containing those preparations, not in the B.P. or B.P.C., which are used in India. It should be compulsory for the formula given in this work to be used throughout India.

"A pharmaceutical society, on lines similar to the British societies, is essential. This society to elect a committee to bring out a work as mentioned above to be used in conjunction with the B.P. A Food and Drug Act to be passed empowering officers appointed by Government to take away samples of drugs from chemists and have them analysed."

The compilation of an Indian Pharmacopœia is a need which cannot be ignored any longer. The cry for it is almost universal.

Dr. Phani Bhusan Mukerji, B.SC. M.B., F.R.C.S., Lecturer in Radiology, Prince of Wales Medical College, Patna:—

"I would suggest in this connexion that there should be laboratories to assay and test the drugs and chemicals with regard to their purity and potency. A central laboratory to deal with imported drugs and provincial laboratories at the capital towns of each province to deal with drugs and chemicals of local manufacture as well as of foreign origin will do this work. These laboratories should be placed in charge of officers who are experts in chemical analysis and in the methods of biological and pharmacological assay. They should preferably be Indians and if Indians of requisite qualifications are not available they may be of any nationality. Not one of these posts should be kept reserved for any of the services. The best men should be obtained from the open market and preference should be given to Indians in filling these posts.

"The proposed legislation should empower Customs authorities to pick out at random a number of bottles out of every consignment and forward them for testing to the provincial and central laboratories. The consignments should not leave the Customs warehouse until the certificates of purity and potency are received from the laboratories. If the tests carried out by the laboratories in India reveal that the drugs contained in a particular consignment do not come up to the standards laid down for them in the Pure Drugs Act of their country of origin, the Customs authorities should have power to destroy these drugs or prevent their entry into the Indian market.

"The legislation should, in my opinion, affect equally drugs manufactured in India for export abroad. I stand for absolute stoppage of manufacture of any drug or chemical, either in India or abroad, by legislative means—which would be a menace to public health in any country by virtue of its being adulterated, understrength, or of inferior quality. Patients and suffering humanity are a sacred trust in the hands of the medical profession; and since physicians do not prepare the medicines they prescribe with their own hands all attempts at exploiting the suffering public by introducing drugs into the market which would not produce the results which they are expected to do should be put down with an iron hand."

Mr. J. N. Rakshit, F.I.C., F.C.S., Chief Chemist, Ghazipur Opium Factory:—

"A Central Chemical Laboratory may be established for the following purposes:—

(1) Working out chemical methods suitable to the local climatic conditions for estimations of all kinds of known and unknown medicines, medicated preparations, and natural and preserved food. Working out Indian Pharmacopœia for indigenous drugs. Conducting researches of any kind connected with Food and Drug Act.

(2) Examination of patent medicines and secret remedies, and verification of their labels and advertisement.

(3) Routine analysis of indigenous drugs and preparations containing them.

(4) Routine analysis of prescription samples and B.P. preparations.

(5) Examination of food and drinks for finding out if the chief constituents are there in undecomposed condition, presence of adulterants, preservatives and flavouring and colouring matters.

"Chemical standards and all other general methods of working of this laboratory should be on the same line and principle as those in Great Britain as far as possible.

"Central laboratory may be established at Calcutta where most kinds of reference volumes are available. Branch laboratories may be opened at all ports and at one of the principal cities of each province where there are no ports. Branch laboratories will be for working only (3), (4) and (5) of the above list. These branches may be made by extending any of the existing local laboratories if such action be economical and mutually convenient.

"In selecting staff for the central laboratory, it would be essential to secure the services of at least two analytical chemists at the beginning, who have already done considerable researches on analytical chemistry and who have also experience of controlling routine analytical work on a large scale. Assistant chemists may be recruited from ordinary graduates with or without experience and from practical chemists with experience in accurate chemical analysis."

Dr. K. S. Mhaskar, M.D., Haffkine Institute, Bombay:—

"Investigation laboratories will have to be established for the purpose of (*a*) examining the standards and purities of drugs as required by legislation, and (*b*) the examination of drugs mentioned in the Ayurvedic, Unani and Sidha systems of medicine. Such laboratories should be located in Presidency towns or at University centres and should be instructed to work in collaboration with the local scientific laboratories. Investigation work should be encouraged and facilities should be afforded for clinical research in hospitals where the different methods of treatment are adopted, e.g., (1) Western method, (2) the Ayurvedic, (3) the Unani and (4) the Sidha.

"In addition to these provincial laboratories there should be a Central Institute of Research whose function should be advisory and for control and direction of the various provincial laboratories. The central institute should co-ordinate the efforts of other laboratories for the purpose of the Drugs and Poisons Act, and the Pharmacy Act; but should leave research workers completely free to follow their inclinations with the proviso that no unnecessary overlapping of research occurs."

Dr. P. M. Nanavati, L.M.S., DD.T.M.H., Acting Chief Medical Officer, Baroda State:—

"In order that the legislation may be properly enforced there should be established laboratories in the towns of each Presidency and it should be the function of these laboratories to test the preparations both indigenous and imported. It should be made obligatory on manufacturers and dealers to produce certificates of their preparations being of the standard strengths from these laboratories before they are allowed to sell them in the market."

The Proprietor, New Medical Hall, Moulmein:—

"If I may suggest, a qualified chemist be employed by Government in the Customs Department in large importing centres, i.e., Karachi, Bombay, Calcutta, Madras and Rangoon—one that can test and analyse. It will greatly assist importers to clear their goods from the customs. At present, the customs give needless trouble as they are unacquainted with drugs, etc. Bottles are opened and sent for test, and when returned the importer is a loser."

The Civil Surgeon, East Khandesh:—

"My suggestions for the control are as follows:—No drugs should be allowed to be brought into India, except those of most reputed firms and that too, with occasional analysis made by a highly competent and well-paid staff of expert chemists and doctors in connexion with each Custom house in India; the expenses of the staff may be paid from the duties imposed upon foreign drugs."

The Chemical Examiner of Salt and Customs, Bombay:—

"Food or drug control rests now in the United Kingdom with the Ministry of Health. The central testing laboratory for food and drugs is the Government laboratory. Under the Sale of Foods and Drugs Act, power is given to Courts of Law to refer sample to the Government Chemists in cases of dispute. Public analysts, appointed by the local authorities throughout the country with the approval of the Ministry of Health, do the necessary testing work in accordance with the Sale of Foods and Drugs Act in vogue. A number of public analysts are well-known chemists, having to their credit brilliant records of investigational work.

"2. The Government laboratory in London is a Central Government organization which at the present time undertakes work for nearly every Government Department.

"3. The Government of India do not have a central laboratory for all Government of India chemical work for civil departments similar to the Government laboratory of London. The Government of India have separate chemical organizations, developed gradually through different periods of existence, and quite distinct from each other in the nature of work done. For example, the Agricultural, the Indian Stores, the Customs, etc., Departments have each got separate laboratories.

"4. It is eminently desirable that, to have a uniform standard of materials and practice, drug control should be a central subject and there should be a central laboratory for the execution of routine and research work. Undoubtedly there should be provincial organizations which should be gradually developed according to the particular needs of the various areas of particular provinces. The provincial organizations should work in close co-operation with and under the general guidance of the central organization.

"5. The question now is whether the proposed central drug control laboratory should have an independent existence or should it be attached to one of the existing Government of India laboratories. As a matter of so-called convenience and economy, it would appeal to the minds of many that it would be best to tag the drug control laboratory to one of the existing laboratories. But I am definitely of opinion that the advantage of economy (because, on a careful analysis this is the only advantage that can be claimed) to start the drug control will be more than counterbalanced by the disadvantages of a joint laboratory and the advantages of an independent laboratory, as noted below:—

"(i) A subordinate existence will deprive the drug control laboratory of the undivided attention, which is so essential for such an important organization, of the working and supervising men to bring it quickly up to the level of a really efficient and useful organization.

(ii) Apart from the routine work, quite a big volume of research work is essential for the successful development of an efficient drug control laboratory. The development of an Indian Pharmacopœia of indigenous drugs will naturally follow as a corollary to the statutory control of drugs in this country. It will, therefore, be in the fitness of things for the central drug control laboratory to take up research work for this purpose and also

to carry out a large volume of research work even for the successful carrying out of routine analysis in connexion with the testing of indigenous drugs. Considering the needs of the work, I doubt if any existing laboratory in the country is sufficiently equipped to carry out this work.

(iii) In the United Kingdom, the public analysts receive a special training in analytical chemistry, microscopy and therapeutics for competency in food and drug testing. Chemical science has grown so much that in the present day it is unthinkable that any specialist laboratory can grow without one or a group of scientists having specialists' training and experience or opportunities to gain them, in particular specialized branches.

(iv) In the best interests of the drug control laboratory, its constitution should be such as to enjoy the fullest confidence of the general and the drug manufacturing public. An independent existence is best calculated for the growth of that reputation."

Mr. M. N. Ghose, Officiating Chemical Examiner for Customs and Excise, Calcutta:—

"In order to assume effective control over the manufacture, importation, sale and dispensing of the drugs the existing laws (Indian Penal Code, Merchandise Marks Act) may be suitably modified. If need be an Act on the line of United Kingdom or United States of America, Acts may be passed here. This may be passed by the central legislature, and powers given to local Governments to make rules thereunder. The existing testing stations (public health laboratory and customs laboratory) for food and drugs analysis at the disposal of the Government should be strengthened. I am not in favour of starting a new laboratory with little experience. One of the main causes why the foods and drugs laws of the country have not been strictly enforced is in my opinion the want of men and money in the laboratories concerned. Another cause is the want of definite standards and tests of foods and drugs in the country. These defects may be remedied by finding out required standards and tests by enquiry and laboratory tests by Government Departments alone or in conjunction with a non-official board or associations. These standards and tests should be simple and practicable and incorporated in the rules under the Food and Drugs Acts in contemplation. Checking and testing of the imported drugs should be entrusted to local custom-house laboratories. They are already assaying the spirit strength of all imported spirituous preparation and are already testing goods for the Merchandise Marks Act and are familiar with imported foods and drugs and are at the gate through which such things are imported into the country and so this procedure will save a good deal of time of the importers. Their duty will be to examine whether the medicines are up to the standard or they are what they claim to be according to their label. The control of manufacture, of sale, and of dispensing drugs in India may be entrusted to the local Public Health Department. Public analysts being limited in India the analysis of food and drugs will be done by the Public Health Laboratory. They will be provided with the necessary staff. An advisory board consisting of eminent physicians, kavirajs and pharmacists under separate sub-committee should be formed to help the Government. Occasional samples of manufactured drugs and raw materials submitted by manufacturers and sellers will be tested by the Public Health Laboratory. These tests will be charged for at a reasonable rate. In order to meet the necessary expenditure in this connexion, funds other than the expected fees must be provided. I suggest that, on the lines of United Kingdom Patent Medicine Stamp Act, an Act may be passed here in respect of proprietary medicines. The duty of the Board will be primarily advisory and educative but in addition it will be also helpful in the due enforcement of the law."

From the Superintendent, Government Test-house, Calcutta:—

"I received a copy of the questionnaire, dated 2nd September 1930, issued by your Committee, regarding the control and maintenance of standards of drugs, but, as at that time the subject appeared to concern principally the manufacturers, importers and users in this country, I did not then address you on the subject.

"I have observed, however, that several witnesses, who have recently given evidence before your Committee, have expressed the opinion that drugs and allied chemicals should be analysed and their standards certified by a central test-house. In this connexion, I wish to inform you that this establishment has a staff of experienced analytical chemists, and has for several years been utilized by the Medical Stores Depot, Calcutta, for the analysis of a considerable number of its drugs and chemicals.

"I therefore suggest that the advantageous position of this establishment for undertaking such work should not be overlooked, in the event of the necessity of such centralized analysis by a Government Test-house being agreed upon."

The question which next arises is whether control should be restricted to western medicines or should also be extended to Ayurvedic and Hakeemi preparations. To quote Dr. C. Rama Kamath, District Medical Officer, Vizagapatam:—

"In India, there are various 'systems' of medicine—Homeopathy, Ayurveda, Siddha, Unani, Naturopathy, etc. These systems will have to be taken into consideration in any legislation regarding drugs and medicinal preparations. A comprehensive legislation to protect fully the interests of the public against the vagaries of any system is out of question at the present stage as it will meet a formidable opposition from the stalwarts of individual 'liberty'. Moreover, these 'systems' have not a standard basis. None can define what is exactly comprised under the term 'Ayurveda'.

"All that can be attempted at present is to obtain an effective control over the foreign and Indian medicinal preparations which are included under the term 'Allopathy'.

"For this purpose, I may be permitted to classify the different preparations under the following heads:—

(1) B.P. preparations.

(2) Non-official drugs—such as luminal, salvarsan, novasural, amytal, avertin, etc.

(3) Biological products—pituitrin, adrenalin, etc.

(4) Proprietary foods—Glaxo, sanatogen, malt and cod liver oil preparations, Mellin's food, etc.

(5) Proprietary medicines—Byno-hypo-phosphites, Huxley's syrup, etc.

(6) Vaccines.

"*B.P. preparations.*—A central analytical institute should be established—preferably at Bombay. All drugs which are below standard are to be rejected. Every container of medicine, bottle, jar, tin, etc., must have a label showing the date of preparation and the date of limitation of its effectivity.

"*Non-official drugs.*—These may be permitted free entry. The analytical institute may give a certificate of approval or withhold it according to its discretion. It will not be possible to have an effective control over them, so long as *Navaroji charms* and *Hanuman kavachams* are permitted free existence.

"*Biological products and vaccines.*—All biological products and vaccines, whether made in India or outside, must pass through the institute. Only those that are approved must be permitted a free sale.

"*Proprietary foods and medicines.*—All manufactures must be directed to give the composition of their preparation which must be shown on the label. Subject to this condition, they may be permitted a free entry."

Lt.-Col. L. Cook, I.M.S., Civil Surgeon, Bhagalpur:—

"My conclusions on this subject may therefore be summed up as follows:—

"(1) That as a large proportion of the people in this country use indigenous drugs, legislation for standardization of indigenous medicines must be included in any project for the standardization of medicines.

"(2) That legislation to standardize only allopathic drugs would have a limited benefit at present.

"(3) That legislation to include indigenous systems and at the same time to protect the public from unqualified charlatans would be unworkable until some guiding influence such as the General Medical Council for India is constituted.

"(4) That such legislation for allopathic drugs could be made profitable to the masses, only if all dispensaries managed by municipalities, local bodies, missions or charities are bound under order of Council to stock such drugs and this procedure would be premature until a General Medical Council for India is established.

"(5) That proprietary medicines should be taxed heavily whether imported or manufactured in the country, the publication of the ingredients of such medicines being a 'sine qua non'.

"(6) That it is more important to legislate against unqualified medical charlatans than against adultered drugs.

"That if legislation could enforce that only qualified and registered medical practitioners could prescribe allopathic medicines the present proposals would be a boon to the country but with no check on the pseudo medical merchants in the country; the proposals, as they stand, would be of benefit only in the large towns or to the intelligentsia."

However, Dr. Nalini Ranjin Sen Gupta, M.D., Calcutta, thinks otherwise:—

"Any legislation tending to interfere with indigenous drugs is bound to do harm. The official pharmacopœia is not the sole repository of knowledge and any interference with the preparation and sale of indigenous drugs must necessarily prove harmful to therapeutic progress. Thus if indigenous preparations of kurchi had been prohibited from being sold in the market because the effects of kurchi were not recognized by us, our new knowledge of kurchi with its remarkably favourable effects in dysentery would not have been obtained and the world would have been all the poorer for it. Similarly if, say twenty years ago, the Chinese had by law, suppressed the advertisement and sale of non-recognized patent preparations for the cure of asthma, all knowledge of the magic virtues of Ma Huang would have been denied us and we would have lost that most invaluable of new drugs—Ephedrine. Again what would be our position to-day in the world of leprosy therapeusis without the use of Chaulmoogra which we only assimilated two or three decades ago. Kuth and Punarnava have been introduced and Chhatim and Bael are slowly coming into use and a host of similar preparations the value of which has yet to be determined are waiting recognition and appreciation. Any interference with indigenous preparations would therefore be wrong in principle and must end in strangling at its very birth the absorption of new drugs from the rich store-house of Ayurveda and we would possibly lose all chance of further discovery of remedies for tropical diseases.

"In the case of continental patents, again, any legislation stopping their entry might have stopped the admission at one stage or other of a whole host of most useful drugs including aspirin, urotropin, atophan, veramon, to mention only a few and certainly of stovarsol which has proved such a boon to chronic suffering humanity in India and a body of official experts a few years ago would have probably punished the advertisement of an arsenical preparation as a cure of dysentery. The same would happen probabaly with the advertisement of Bactrophage as a cure for cholera. The fact is that we are apt to forget that we owe the inception of bacteriology to a lay man and our knowledge of quinine itself to lay people. What has happened in the past can again happen in the future and it is quite possible that officials might ignore the existence of a new drug however valuable it might be. In the circumstances, it is obvious that official control of foreign and indigenous preparations or indigenous proprietary remedies, unless it is proved that they are positively poisonous, cannot be thought of. For the present, we should confine our attention to the control of pharmacopœial products alone. In the case of these products rigid standards should be enforced and any violation penalized. We cannot afford to have Dover's powder without opium or Tr. Digitalis without Digitalis being sold in the market. This is playing with human life."

Anent Provincial Medical Councils, Dr. Hari Singh Bisht, Teacher of Materia Medica, Agra, and Dr. A. Lakshmanaswami Mudaliyar, B.A., M.D., Madras, have recognised their necessity and importance in their memoranda.

Rao Sahib T. S. Tirumurti, B.A., M.B., C.M., D.T.M. & H., Professor, Medical College, Vizagapatam, is of opinion that—

"A Committee should be appointed to frame a Therapeutic Substances Act (Allopathic) to suit the circumstances of this country and to alter or amend the existing Patents and Trade-marks Acts to prevent the sale of secret remedies. The Committee should be composed of legal, medical, business and technical men, pharmacologists and representatives of Government."

Many of the witnesses are in favour of a central controlling body, with or without provincial ramifications. Thus, Dr. S. C. Das, M.B., Lecturer in Pharmacology and Materia Medica, Robertson Medical College, Nagpur:—

"It is necessary to have control over manufacture and importation of drugs. For the purpose of such control, a central body mainly of experts (official and non-official) with similar bodies in the provinces should be constituted. (A strong representation of non-official element is necessary to gain the confidence of the public. Already there is a section of the public who are inclined to attribute ulterior motives in this move of official control of drugs and also think that a purely official body would be deleterious and perhaps partial to certain particular section.)"

Captain S. Bindra, M.B., B.S., Bindra Chemists, Rawalpindi:—

"A board of chemists, doctors and scientists be formed. The Board, if it suspects any preparation or drug, should send it to a properly equipped laboratory for testing such preparation. The laboratory should be equipped by Government and controlled by the Board. All doctors and chemists should be permitted to send their complaints to the Board and if the Board considers it advisable they should have the preparation tested."

Captain P. De, B.SC., M.B., M.R.C.P., Officiating Professor of Pharmacology, School of Tropical Medicine and Hygiene, Calcutta:—

"*How the drugs in the market could be controlled.*—In the United States of America a Food and Drugs Act was passed several years ago (1906) and many amendments have since then been made to bring the original Act up to date and to meet the exigencies of the situation created from time to time. All drugs for sale in the market are required to be passed by a board and a certificate or licence is issued which is the guarantee of purity for the public. Even raw materials are subjected to scrutiny at the ports of entry and without the sanction of the board of control nothing is allowed to pass in. The Act also applies to drugs which are exported or in inter state commerce. The Bureau of Chemistry of the Department of Agriculture is entrusted with the work of testing and analysing all the drugs and chemicals and their certificate must be sent to the Customs authorities for permits in cases of import or export.

"The 'Sale of Food and Drugs Act' of the United Kingdom is not so comprehensive. The City municipal authorities are usually entrusted with the maintenance of the provisions of the Act. Some inspectors are appointed whose business is to go round the markets and pick up suspected medicines for analysis at the laboratory. With the introduction of the Therapeutic Substances Act in Great Britain, the control is now exercised not only on the ordinary pharmaceutical preparations but also on drugs which are not capable of being tested adequately by ordinary chemical means, e.g., sera, vaccines, gland products, organic arsenic compounds, etc.

"If an attempt is made to control the drugs and chemicals in the Indian market some machinery, closely following the American and the British systems detailed above, would have to be set up, due consideration being allowed for the peculiar conditions existing in India. In the first place some legislation will be needed and a 'Pure Drugs Act' will have to be passed laying down standards for the strength of the medicinal preparations and protecting them from adulteration and also controlling the patent and proprietary medicines put on the market. Those preparations with secret formulae should be completely banned. For enforcing the provisions of the Act, a board of control under the Government will have

to be constituted. This board should have a laboratory under their guidance (like the Bureau of Chemistry in America and the National Research Council in Great Britain) to carry on the analysis and testing of drugs and chemicals. Without a machinery to perform analysis and testing and to pronounce judgment on the quality, legislation will have little value. The proposed board should work under the Central Government as otherwise difficulties might arise in the smooth working of the board. The proposed central laboratory under the board of control might have the following constitution:—

"(1) *Chemical unit.*—Consisting of experts in chemical and biochemical analysis. This section will deal with all drugs and chemicals which are capable of being tested by chemical means.

"(2) *Biological unit.*—This branch should consist of trained and experienced pharmacologists who will carry on animal experiments and give opinion on those substances which are not capable of being tested by chemical means.

"Both these sections will carry on assay work to lay down standards of purity and potency which will have to be followed by all concerned. The Customs Department will co-operate with the central laboratory and all drugs and chemicals imported should be passed through a preliminary testing before it should be allowed to be launched into the market. About drugs manufactured in India, all manufacturers should get their drugs tested in a laboratory before putting it into the market. No piecemeal legislation will serve the purpose. It will defeat the very object for which it is intended."

The Head of the Department of Pharmacology, King George Medical College, Lucknow:—

"There will be obvious difficulties in putting into action any law that is enacted unless the Government is prepared to establish a central laboratory, both chemical and biological, which is competent to deal with standardization of both chemical and biological products more or less on the lines similar to those of America and England. The existing laboratories in India are, to the best of my knowledge, not competent to deal with standardization of biological and chemical products.

"Another point which I would like to emphasize is that an improved Poisons Act, institution of diploma for trained compounders and dispensers and penalising the employment of untrained compounders should precede the proposed legislation."

The Secretary, Bengal Medical Association, Calcutta:—

"Our association feel that legislation will not be able to check adulteration unless the punishment be deterrent and punishment can only be made deterrent by Government if the analysis of medicines is done thoroughly by real experts whose honesty can never be questioned. In order to do it an up-to-date laboratory should be established in each province, manned with real experts and controlled by a committee of elected representatives with *non-official majority and non-official president.*"

Lt.-Col. K. G. Pandalai, I.M.S., Medical College, Madras:—

"In a purely surgical practice like mine, there is need for very little prescribing, but I am aware that there has been a considerable increase in proprietary and secret preparations both imported and indigenous. It is possible to control the production and sale of Allopathic preparations by instituting a system of State licence. Analysis will have to be carried out if licensing should be effective and for this purpose I would recommend that one or two central institutes be opened in important centres.

"In the case of indigenous preparations, standards of strength and purity could also be laid down if analytical laboratories under properly trained persons are attached to existing medical institutions where indigenous drugs and preparations are in daily clinical use. I suggest that a beginning could be made in this city where a large institution of this type already exists. In a few years standards would be available for all indigenous preparations used in Southern India. Thereafter it should be easy to control the manufacture and sale of such preparations as in the case of Allopathic drugs. I am of opinion, therefore, that the steps to be immediately taken are: (1) for the Government of India to locate in one or more

important centres well-equipped laboratories for drug analysis and research. This matter being important, part of the funds allotted for general research purposes could be devoted for this purpose. Thereafter every firm or individual wishing to sell or manufacture any allopathic preparation in India would have to submit samples with a statement of composition to a drug licensing board. A fee will have to be charged to cover the cost of analysis. Drugs and preparations sold without a licence should be seized. (2) The next step is for each provincial Government to equip in the Presidency town a laboratory for the study of Indian preparations. These laboratories should be attached to hospitals or wards for the clinical study of such preparations. As soon as standards are laid down for Indian preparations all such should be incorporated in the Indian Pharmacopœia to be. (3) As soon as the All-India Medical Council has been created a Committee of this Council should be formed for the purpose of compiling an Indian Pharmacopœia. To begin with the standards laid down in the B.P. may have to be adopted but as the Indian Pharmacopœia grows by the yearly addition of indigenous or other drugs the standards could be modified according to circumstances. (4) Fourthly, it is immediately desirable to attach to all medical schools and colleges in the country, lecturers in indigenous medicine. This is suggested with a view to educate the future medical practitioners of India in the use of a number of indigenous drugs which may, before long, be incorporated in the official Indian Pharmacopœia."

Ultimately for a great number of witnesses the question of control resolves itself into opening laboratories. As to the functions of those laboratories many are the suggestions. Dr. B. B. Bhatia, Lucknow, is of opinion that—

"Before bringing the legislation in force, there ought to be provided a central laboratory, where the drug manufacturers of this country could have an easy access to have their products chemically and physiologically assayed at a nominal fee."

Dr. Panna Lal Sood, Civil Dispensary, Lucknow:—

"It would be of advantage if an institution be opened where it will b possible to get doubtful drugs identified and preparations analysed free of charge. Anybody found committing fraud by way of adulteration or substitution be liable to punishment under a law to be enacted in this connection."

Dr. K. Venkatachalam Pillai, Acting Professor of Pharmacology, Medical College, Madras:—

"In the interest of the doctor and the patient alike, it is essential that the purity and potency of the drugs supplied by dispensing chemists and drug dealers should be safeguarded. For this purpose, State laboratories should be instituted at the Presidency centres in the country, where drugs and medicines from the local market should be analysed, examined and standardized. It should be arranged to procure for periodical examination at these laboratories, drugs and medicines stocked by the drug dealers and dispensing chemists and, in all cases, certificates of purity and potency of the samples selected at random and tested should be issued to dealers. These certificates should be made renewable, in all cases, at prescribed intervals of periods. Provision should also be made for surprise inspection and collection of drugs and medicines for examination at the laboratories. To check malpractice of dispensers, medicines should be got on test prescriptions and examined in these laboratories for purity and strength at frequent intervals."

Dr. S. A. Talib, D.P.H., Assistant Director of Public Health, Gujarat R. District:—

"In India the health officers are expected to inspect drugs intended for public sale. But this provision is hardly availed of on account of the local difficulties of health officers and, perhaps, on account of the corruption obtaining at the chemical examiners' laboratories. I suggest that these two difficulties be suitably remedied. Every sufficiently trained health officer should have a laboratory at his disposal for analyses as a control against the results given out by the chemical examiners."

The Civil Surgeon, Kangra, Dharmsala:—

"It is suggested that there should be a permanent committee who should register the name of the chemists and druggists in the country, so that in the event of any of these firms supplying inferior or adulterated drugs, the matter can be referred to them for investigation and if the firm is found guilty their name should be removed from the register and the matter given a wide publicity."

Dr. Hansraj Vig, M.B.B.S., Gujranwala:—

"There must be a central laboratory in which all pharmacopœial and proprietary preparations should be tested as regards their proper strength and effect, whether they are of foreign make or local make. No batch of any drug or medicine should be put in the market unless it has been tested. This must be the duty of manufacturers to have its preparations tested before being sent for sale. Any person violating this should be made punishable by law."

The Civil Surgeon, Monghyr:—

"I consider that the frequent examination of drugs in use or for sale to be very necessary and venture to suggest as follows:—

"A. Samples to be taken and any necessary prosecutions to be carried out by the Salt and Excise Department.

"B. Central laboratories to be maintained, say at Calcutta, Madras, Bombay, Lahore and Rangoon, to do the necessary analysis.

"C. Laboratories to be governed by the All-India General Medical Council when formed.

"The actual working committee to include not only pharmacologists but also analytical and manufacturing chemists.

"I consider that the controlling authority should be all-India in preference to provincial or municipal as tending to efficiency and economy and being less open to local prejudice and influence."

The Civil Surgeon, Purnea:—

"Until the establishment of the General Medical Council in India and the Central Research Institute, the Tropical School of Medicine should have a special Analytical Department which will issue certificates to manufacturers, as to the purity and potency of the drugs they issue, on payment of a fixed scale of fees. Imported drugs should also be made liable to such tests unless they are guaranteed by the International Committee of Drugs Standardization. In any case, the other foreign products (not certified reliably on the Continent or America) should bear some stamp of approval by some Indian agency as well, when such agency is established."

This brings in the question of an All-India Medical Council and a Pure Drugs Act, mentioned by Dr. P. S. Macmahon, M.SC., B.S.C., F.I.C., Public Analyst to Government, United Provinces, in his memorandum.

The Indian Merchants' Chamber, Bombay:—

"The Committee suggest that there should be an All-India Council to determine the standards of drugs on western lines, and also another for determining standards on Ayurvedic and Unani lines. They are also of opinion that the central council should prepare an encylopædic compilation with regard to drugs on Ayurvedic and Unani lines, and a pharmacopœia of Indian drugs on scientific lines.

"The Committee are of opinion that it is highly essential to have a Pure Drugs Act for the country for ensuring the purity and standardization of drugs and proprietary foods used for medical purposes."

Pharmacists should be given an adequate share in the control. Dr. P. Das, P.H.C., M.S., etc., Consulting Chemist and Bacteriologist, Shillong:—

"In connexion with the present movement that is going on with regard to the raising of the status of the pharmaceutical trade in India we would like to suggest that duly qualified and experienced pharmaceutical chemists should be given preference over the medical men for the more efficient dealing of the question.

"The United States of America probably leads the world to-day as far as the thoroughness of organization in the pharmaceutical line is concerned. The United States Pharmacopœia is supposed to be the most up-to-date, frequently revised and well controlled pharmacopœia. The Pharmacopœial Revision Committees there consist of a majority of qualified and experienced pharmaceutical chemists with a minority of medical men. In the enactment of drugs laws and regulations also the pharmaceutical chemists play a prominent part there.

"Similarly, if the intention of the present movement is to make a thorough survey of the present condition of the trade and to find out the best remedy according to the peculiar condition and the needs of this country, we think that the American methods of controlling the trade should be followed and more non-official members of the pharmaceutical profession, who are qualified and experienced, should be included in the Committees that are being formed for the purpose.

"Colleges of Pharmacy for imparting higher pharmaceutical education in this country should be started to produce a better qualified class of chemists than the ordinary compounders now available in this country.

"A pharmaceutical society or association with official status should be inaugurated in this country on similar lines and status of the English society and the American association.

"In our opinion the question of raising the status of the Ayurvedic and Unani medicine trade should also be considered side by side with that of the pharmacopœial medicine trade as far as possible to make the movement more popular in this country."

Finally the most important question of 'local manufacture' ought to be considered as pointed out by Dr. K. S. Ray, the Joint Honorary Secretary, Indian Medical Association, Calcutta, in his memorandum.

The Principal Medical Officer, Bikaner State:—

"The Government should bear in mind the handicap that local drug industry has to put up with in competition with foreign firms which have been established for many years."

The Sind Medical Union, Karachi:—

"Finally, we wish to state that some of the recommendations are likely to make the condition of the drug industry in India more costly. At present the industry in India is trying to stand up on its legs and in our opinion certain amount of protection and encouragement is absolutely necessary to allow it to compete with the well organized and firmfily established industry of the west. We, therefore, recommend that your Committee will be pleased to suggest suitable tariffs to achieve our objects. We trust that your Committee will see that the apprehension felt in some quarters that your Committee is formed to stifle our industry in its infantile condition is falsified."

Capt. P. De, B.SC., M.B., M.R.C.P., Officiating Professor of Pharmacology, School of Tropical Medicine and Hygiene, Calcutta:—

"Now-a-days a number of firms has taken up the manufacture of drugs and chemicals in India. Quite recently, the manufacture of biological products and organic antimony and arsenic compounds have also been started. While refraining from making any adverse criticisms on the quality and potency of these indigenous preparations, I would like to point out that some control is absolutely necessary on these preparations also. I have assayed a large number of tinctures and liquid extracts from some of these manufacturing firms and have found some of them below standard though it must be admitted that the majority of these preparations is quite up to the standard. I would like to quote the following lines regarding tincture digitalis from a paper published by Lt.-Col. R. N. Chopra, I.M.S., and myself: 'One-third of the total specimens of tinctures prepared from all kinds of leaf for the market which were sent to us for assay were found to be absolutely inactive and had to be condemned and discarded. As these were prepared by reliable firms under most favourable conditions, the danger of using unstandardized preparations can be readily understood.'" (*The Indian Medical Gazette*, Volume LXIV, No. 6, June 1929.)

Honorary Captain Rai Bahadur Dr. Maharaja Kishen Kapur, Lahore:—

"As this will materially increase the cost of medical treatment it is very necessary that the Government should encourage local chemical and drug industries by State aided or model factories started by Government agencies in the beginning."

Dr. S. C. Das, M.B., Lecturer in Pharmacology and Materia Medica, Robertson Medical College, Nagpur:—

"So far as local manufacture is concerned—

"(i) All manufacturers should be registered; permission for such manufacture is to be given by the central organization or by the provincial body on being satisfied that the manufacturer has got sufficient equipment and efficient staff for the purpose and satisfied other conditions prescribed by the central body. (Licence fee should be a small one, otherwise it would be an indirect taxation on drugs.)

"(ii) There should be occasional inspections of the places of manufacture and occasional testing of raw materials used for the purpose.

"(iii) Each batch of manufactured articles should be accompanied by a certificate of potency and purity to be specified by the pharmacopœia for India, from an authority regarded as competent by the central body.

"(iv) There should be occasional testing of such products to serve as a check. For this purpose a Central Testing house should be formed to ensure uniformity of testing standard."

Dr. Phani Bhusan Mukerji, B.SC., M.B., F.R.C.S., Lecturer in Radiology, Prince of Wales Medical College, Patna:—

"I would like to mention here that all legislative measures to put a stop to importation of impure and understrength drugs and chemicals or their manufacture in this country will be incomplete if vigorous efforts were not made simultaneously to encourage manufacture of medicinal preparations in India out of the raw materials which are found and grow in abundance in this country. What I mean is that the proposed legislation should also lay the foundation of a pharmaceutical industry in India in order that India may be independent of foreign countries for the supply of her needs of drugs and chemicals. The lesson that we learnt during the last war should not be forgotten in this connexion. We have plenty of raw materials for the manufacture of practically every drug that we need for the treatment of our patients and it is a huge drain on the nation's purse to see these raw materials being exported to foreign countries at nominal cost and then to pay ten times the price for the finished products which are made out of them."

But, Messrs. Smith Stanistreet & Co., Manufacturing Chemists, Calcutta, call our attention to some of the difficulties which beset Indian manufacture:—

"We do not experience any serious difficulties from Custom's regulations. We should like to see the duty on some of the raw materials which are not indigenous reduced in conformity with the usage in other countries.

"The Excise Department, however, is a serious handicap to trade. In the first place the delays in getting the slightest business through the department are appalling. These are perhaps only partly due to the regulations, but they constitute a very serious difficulty. Although this difficulty is largely departmental and may be ameliorated by increasing the staff yet there seems to us to be a great deal of unnecessary work due to useless and vexatious regulations.

"Our chief difficulties, however, as far as excise regulations are concerned are due to differences in excise procedure between the Provinces. The Central Government has issued a note to the effect that there should be no excise restrictions as between the Provinces, that is to say that a spirituous medicinal preparation that has complied with regulations and upon which the duty has been paid is free to be sent to every part of India regardless of provincial boundaries. As the excise duty on medicinal spirit is the same in every province and as there are no customs frontiers between the provinces this seems the only fair way of dealing with the matter, and all the provinces except the Madras and Bombay Presidencies have accepted this ruling.

"As regards Bombay, this Presidency requires that each consignment of spirituous medicinal preparations shall be entered on a separate form and the duty paid on it credited to the Bombay revenues, and when this has been done a transport permit for the consignment is issued. This causes delay amounting to weeks.

"The Madras Presidency insists on these preparations being sent to Madras in bond and the duty paid there. This has compelled us to have a paid representative in Madras to clear the goods through the Customs and pay the duty, and the delay and trouble and extra expense are such as to put an end to this trade except as regards Madras City itself.

"We sent a note through the Calcutta Trades Association to the Simon Committee regarding this excise problem. It seems to us that the revenue from excise duty on medicinal spirituous preparations might be credited to the Central Government and thereafter distributed to the different provinces according to population or any other method that would be convenient and fair. The revenue from these are comparatively very small and do not justify these vexatious, harassing, and trade-destroying measures.

"The establishment of drug manufacturing laboratories by the Government Medical Stores Department for the manufacture and supply of articles which are manufactured in India to Government, Private, and Missionary Hospitals and Dispensaries, Railways, and other Government Departments, Indian States, etc., is a serious encroachment on our legitimate province. When there were no manufacturers of these products in India the policy of maintaining Government manufacturing laboratories was necessary. It certainly cannot be justified now. The Government Medical Stores should be merely a purchasing and distributing department and should be confined to Army supplies only. It is not only an anachronism to-day, but a serious and unfair competitor to the drug and chemical trade in India, and militates against the growth of an efficient and qualified body of drug and medicine manufacturers and vendors in India without which any legislation for the betterment of the drug supply in India will be extremely difficult, if not impossible, to carry into practical effect.

"Half the difficulties under which we as manufacturers labour, apart from those from which there is no escape such as high temperatures at certain seasons and other disabilities due to our geographical position far from central markets and machinery makers and designers, would disappear on the establishment of sound drug laws and the registration of all who deal in drugs and chemicals.

Some of these are—

The lack of a satisfactory drug market.

Adulterated and false indigenous drugs.

Speculation and 'cornering' of drugs.

Dumping of inferior drugs from abroad.

Interference with our markets by petty dealers who sell inferior drugs. District Boards Local Boards, Municipalities and Health Departments buy from small local dealers who have no stocks, no facilities and no knowledge of drugs.

"Our other troubles, although good drug laws might help, require something more.

Some of these are—

High rates of railway freight on raw materials and products.

High import duty on raw materials not produced in India.

Manufacturing of galenicals by Government.

Restrictions between provinces.

"Government can do a great deal to foster the drugs manufacturers of India by dealing with the abovementioned difficulties and in addition would it not be possible to have a sort of Board of Control of drugs to prevent waste of public money by District Boards, Municipalities, etc., by inspecting the quality of the drugs in these institutions and maintaining a register of firms or individuals from whom drugs may be purchased? We believe there is a great waste of public money in these institutions through inferior drugs and short measure and other evils."

Rai Sahib T. Bhattacharyya, B.A., Commissioner of Excise and Salt, Bengal, however, observes:—

"There are no restrictions to the export of duty-paid spirituous medicinal preparations from Bengal, to any province in India except Bombay and Madras." When the question of the principle to be followed regarding levy of duty on indigenous spirituous medicinal preparations was referred to all the local Governments by the Government of India, all provincial Governments except those of Bombay and Madras agreed that duty on indigenous spirituous preparations should be retained by the province of manufacture while Bombay and Madras were in favour of dictum of 'duty following consumption' even in regard to indigenous spirituous medicinal preparations. The following rules regulating the import of spirituous medicinal preparations into Bombay and Madras have been prescribed by the Governments of Bombay and Madras:—

"*Bombay.*—Import is allowed only under an import pass or permit granted by the Excise authorities in the district of import. Duty is either to be prepaid in the district of import before the issue of the import pass or it may be credited by challan in the province of export on receipt of the import pass the words 'for credit to the Government of Bombay' being clearly written in red ink on the challan. Import is also allowed under bond for payment of duty in the district of import.

"*Madras.*—Import is only allowed on an import pass or permit granted by the Excise Commissioner, Madras Presidency, on prepayment of duty at the place of import. No payment of duty to the credit of Madras Government is as a rule made in Bengal. Import is also allowed by sea under bond.

"As regards the analysis of each item of spirituous medicinal preparation in the consignment, a request was made to the Excise Commissioner, Bombay, to dispense with the chemical test carried out on the arrival of the consignment in Bombay and to accept the declared strength by manufacturers supported by the certificate of the Assistant Chemical Examiner to the Government of Bengal. He has recommended to the Government of Bombay this suggestion for approval. The final decision of that Government has not yet been communicated to us.

"It is a fact that there is no restriction to inter-provincial trade (export and import) in spirituous medicinal preparations, imported from foreign countries which have paid the duty at the port of landing.

"As stated already there are no restrictions to the export of duty-paid spirituous medicinal preparations to all provinces in British India except to Bombay and Madras. If Bombay and Madras agree to the retention of the duty on exports of spirituous medicinal preparation by the province of manufacture the difficulties pointed out in the note would automatically disappear. If however, they insist on getting the duty on imports of spirituous medicinal preparations in their provinces, as at present, some of the difficulties would cease if they allow imports on payment of duty to their credit in the province of manufacture, such imports being covered by passes to be granted by the Excise authority in the province of manufacture.

"As regards the difficulties pointed out in the concluding portion of the note, I beg to observe as follows.

"Concession rate of duty on rectified spirit and absolute alcohol is being already enjoyed by manufacturers who are carrying research or experimental work.

"Manufacture of alkaloids comes under the generic heading of bona fide medicinal preparations. Permission is granted to use spirit in dry extracts, ethyl esters of preparations used as medicine.

"The cost of supervision of a bonded laboratory including leave and pension contributions is realized from the bonder for the following reasons:—

(*a*) The duty on spirit used in the manufacture of medicinal preparations is realized at the concession rate of Rs. 5 per L.P. gallon on the spirit content of the medicinal preparations at the time of their issue and not on the spirit taken under bond for purposes of manufacture. No duty is realized on the spirit lost in the process of manufacture. The quantity of spirit lost in manufacturing processes is considerable and the duty on the same at the concession rate of Rs. 5 would come to a considerable sum. This is the primary reason for charging cost of supervision from the bonders.

"Another advantage accrues to the bonders from their payment of the cost of supervision, namely, that if no costs were levied, any one might claim to set up a laboratory. The constant threat of competition from small concerns and their frequent appearance and disappearance would be harassing to the established bonders. The obligation to pay for the staff is a check on reckless enterprises."

Dr. Frank Noronha, M.B.C.M., D.P.M., Superintendent, Mental Hospital, Bangalore:—

"There are drug vendors of all sorts in large cities. They issue elaborate price lists giving cheap rates for drugs, and chemists of moderate means will naturally get their supplies from them. There is no guarantee that these drugs are above suspicion. I have at present a stock of magnesi sulphas which has become partly oxidised and is quite ineffective. When deterioration of drugs due to climatic and other conditions takes place in this country, we should not depend on medicinal preparations of foreign manufacture. The foreign goods have to be obtained in large quantities at a time. If the same articles are made in this country they could be obtained in smaller quantities, freshly prepared, as often as necessary.

"Authorized manufacture on a large scale of as many pharmacopœial requirements as possible, should be encouraged in this country. Whether this should be undertaken by Government or entrusted to a private agency is a matter of detail. But preparations of standard quality and potency should be made available in this country, at short notice. If the quality of local preparations is ensured there will be less demand for imported drugs of doubtful quality.

"The scientific side of this question of drug control should be developed on an all-India basis. Pharmacological laboratories for the manufacture and supply of as many pharmacopœial preparations as possible, to meet the needs of the country, should be established. The Central Government should give the lead in this matter and encourage private enterprise with the necessary Government control. The Indian practitioner needs to know where he gets his drug supply from and to be assured of its efficiency.

"The legislative aspect with regard to the control over the sale of drugs, licensing of chemists shops, and the raising of the status of the chemist should be the concern of each provincial Government."

Dr. B. S. Mozumdar, Secretary, Berhampur Medical Association, Murshidabad:—

"We would suggest the appointment, for at least five years, of an Advisory Committee of experts, whose function will be simply to guide and see the local chemical and drug industries run on exact scientific lines. If, after the expiry of that period, it is found that some controlling legislation will be of real benefit to the manufacturers and the suffering public alike, and if those concerned really want any such control, then and not till then will arise the necessity for a legislation.

"Everyone wishes that all drugs and chemicals either of Indian or foreign make, which are used in the treatments of patients, should be of pure quality and of proper strength. But no amount of legislation will succeed in maintaining their purity and strength, unless the manufacturers themselves realize the need of using pure drugs, both for their own safety and that of the public in general.

"Further, only such control should be exercised which will not prove a discouragement to manufacturers of drugs and chemicals and which may not inflict a death blow to the newly growing medicinal industry.

"So, we would suggest that an Advisory Committee of expert pharmaceutical chemists and medical men of India be formed and empowered to guide the local concerns on scientific and healthy lines. It will be the business of the Committee also to see that no proprietary medicine with a secret formulæ is put up in the market and to publish the formulæ of the secret remedies already in the market."

Rao Sahib T. S. Tirumurti, B.A., M.B.C.M., D.T.M. & H., Professor, Medical College, Vizagapatam:—

"A greater insistence on *qualified chemists and druggists or pharmacists*, being employed as Managers or Superintendents of firms in which

drugs and chemicals are manufactured and the employment of only *qualified compounders* for the dispensing of medicines should be aimed at, as first steps in legislative measures, which may be considered desirable in the future for greater control over the manufacture of drugs and chemicals and biological products, used by the followers of the allopathic system of medicine."

Dr. T. N. Mazumdar, Chief Health Officer, Corporation of Calcutta:—

"*Legislation regarding manufacture and sale of drugs.*—When the provisions of the existing Municipal Act were drafted, the existing laws on the same subject in the following foreign countries, viz., Great Britain, United States of America, Victoria, New Zealand and New South Wales were incorporated with necessary modifications.

"Regarding legislation for control of adulteration of drugs, the Calcutta Municipal Act, 1923, contains certain provisions, which may be applied to the whole of India. The sections dealing with the same are given below:—

Section 3 (2) (*a*) (i) *and* (ii) 'adulteration' defined.

These provisions are similar to those of United States Food and Drugs Act. I would suggest that Government should be approached to specify one or more particular pharmacopœias to which the drugs should conform. In cases where no pharmacopœias are mentioned, and where the composition is not stated on the label, the drugs must conform to the B.P. standard.

Section 3 (42) 'misbranding' defined.

Section 406.—Prohibition of sale, etc., of adulterated or misbranded food or drugs.

Section 412.—Prohibition of sale of unwholesome, etc., drugs.

Section 413.—Licensing of shops and places for retail sale of drugs.

Section 414.—Rules prescribing qualifications of compounders.

Section 415.—Prohibition in respect of compounding of drugs.

Section 416.—Saving as to practitioners of indigenous medicines.

Section 418.—Provision for inspection of factories of drugs.

Section 419.—Power to seize drugs unfit for medicine.

Section 420.—Destruction of the drugs seized under 419.

Section 421.—Taking before Magistrate drugs seized under 419.

Section 422.—Local Government to declare standard of drugs.

Section 423.—Power of purchaser to have article of drug analysed.

Section 424.—Compulsory sale of drug for analysis.

Section 426.—Drugs directed to be destroyed, to be property of the seizing authority."

Major D. Clyde, I.M.S., Civil Surgeon, Meerut, remarks:—

"The regulations should be of two kinds (1) something on the lines of Pure Food and Drugs Act in force at home and the Therapeutic Substances Act, and (2) the enforcing and the alteration of Acts for preventing adulteration of drugs which are at present farcical—such as the United Provinces Prevention of Adulteration Act VI of 1912 as amended by Act I of 1916. To take this Act first, it is obviously based on the English Sale of Food and Drugs Acts of 1875, 1879 and 1899. It has been in force in the United Provinces for about twenty years and has been absolutely ineffective.

"With regard to (1), a pure Food and Drugs Act should be an all-India Act—(*a*) should lay down standards, (*b*) should lay down rules for the affixing of a label on to the bottle giving the contents, date of expiry and quantity of active drugs. Existing medical colleges should train students and issue certificates as dispensers.

"These certified students should then be apprenticed to a firm having a qualified man at its head for a period of one year after which they should appear for the final examination.

"Shops having no certified dispenser should be licensed to sell only medicines put up in original sealed packets by reputable firms, who would

be liable to be prosecuted and not the vendor, if the contents were found to be defective in quality, substance or nature from the label affixed to the packet.

"All shops selling medicines and drugs of a proprietary nature to be licensed.

"A heavy penalty to be imposed if any firm, not having a qualified dispenser, sells any drug or mixture, or proprietary article which comes within the schedule of poisons.

"Indian Penal Code Rules regarding drugs are useless—

Section 274 demands that the one who actually adulterates the drug be prosecuted.

Section 275 demands that it be proved that the seller, etc., knew it is adulterated.

Section 276 can never be proved."

Heavy penalties are favoured by many. Thus, the Civil Surgeon, Allahabad, writes:—

"The lines of the Sale of Food and Drugs Act should be followed so far as possible. As sufficient inspectors are not likely to be available, complaints from the medical profession should be invited and the health officers should collect samples. The essential is that effective penalties should exist, without which practitioners know it is useless to complain."

And William Cotton & Co., Simla:—

"Any manufacturer found out supplying spurious or inferior drugs should be black listed. Also any licensed chemist found with such drugs in his possession should lose his licence and be otherwise penalised."

M. N. Ghose, Esq., Officiating Chemical Examiner for Customs and Excise, Calcutta:—

"The control of therapeutic agents, indigenous or imported, is necessary in this country. It is an admitted fact that the existing laws and the machinery for enforcing them are not adequate to deal with adulteration or other fraudulent practices, defective manufacture from carelessness or want of knowledge, and too long storage whereby the efficacy of a drug is materially affected. Acts on the lines of the United Kingdom or United States of America Acts are badly needed here. The conditions of this country, however, being different from those of the United Kingdom or United States of America, will not permit of the adoption of the Acts of those countries without suitable modifications. Moreover, it will not be advisable to launch upon a scheme which entails a huge expenditure, e.g., setting up a central laboratory and erecting local stations for the testing of drugs. We should try to make the best of the existing departments and local organizations.

"The sections of the Indian Penal Code which are intended to check the manufacture and sale of adulterated drugs are not sufficient safeguards against such offences. The merchandise Marks Act has also provisions for combating fraudulent use of "Marks, indicating standard composition" on labels of imported drugs. But for various reasons the above two laws have failed to effectively check the various sorts of offences. I think a specific law is needed or the existing law should be modified suitably to combat the difficulties where the existing laws fail. The want of some sort of "Standard" is in my opinion another drawback which should be overcome before a satisfactory solution is reached. The United Kingdom and United States of America Food and Drugs Acts will be helpful in these directions.

"Now, as regards the line in which the legislation is to be made:—The Acts analogous to the one needed here are the United Kingdom Food and Drugs (Adulteration) Act, 1928, and the United States of America Food and Drugs Act, 1907. I have endeavoured to point out in the following paragraphs the main characteristics of these two Acts and how they can be modified to suit our purpose.

Provisions.—The United Kingdom Act (1925) has scope for—

(1) Prohibition of the mixing of injurious ingredients and of selling the same,

(2) Prohibition of the mixing of drug with injurious ingredients and of selling the same.

(3) Exemption in case of proof of absence of knowledge.

(4) Prohibition of the sale of articles of food and of drugs not of the proper nature, substance and quality.

(5) Provision for the sale of compounded articles of food and compounded drugs.

(6) Protection from offences by giving of label.

(7) Prohibition of the abstraction of any part of an article of food before sale and selling without notice.

The United States of America Act aims at—

Prevention of the manufacture, sale or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, etc., and for regulating traffic therein and for other purposes.

And I propose that legislation here should have the provisions of the United States of America Act set forth above.

Proceedings

"*United Kingdom.*—The Local Authorities are the proper persons to take proceedings and, if they fail to take necessary action, the Ministry of Health or Minister of Agriculture and Fisheries may take arrangements for its enforcement.

United States of America.—The Secretary of the Treasury, the Secretary of Agriculture and the Secretary of Commerce and Labour are authorized to make uniform rules and regulations for carrying out the provisions of this Act (Section 3).

Here the Minister in charge of Public Health Department will be the proper authority to take proceedings in consultation with other departments if necessary.

Examination of specimens

"*United Kingdom.*—The certificate of the Public Analyst is sufficient evidence of the facts therein stated, unless the other party requires that he shall be called as a witness.

United States of America.—Examinations of specimens of drugs suspected to be adulterated or otherwise defective shall be made by the Bureau of Chemistry of the Department of Agriculture (Section 4).

My suggestion is that for the present the Public Health Laboratories and the Local Customs Laboratories should be the testing centres for indigenous and imported drugs respectively.

Standardization of drugs

"*United Kingdom.*—There are no standards for drugs set out in the Act. Section (1) (*b*) declares that it is an offence to mix, colour, stain or powder any drug with any ingredient or material so as to affect injuriously the quality or potency of the drug. It is at the same time an offence to sell a drug so treated. Although no mention is made in the Act of the British Pharmacopœia, there is no doubt that this authority is accepted by the courts as a *prima facie* standard to which samples of drugs sold under B.P. names must conform. Section 2 of the Act enacts that "no person shall sell to the prejudice of the purchaser any article of food or any drug which is not of the nature or the substance or the quality of the article demanded by the purchaser." Allowances are however made in the cases when it is shown by the defendant that (1) the added material, not being injurious to health, has been added because it is required for the production of the drug as an article of commerce, etc., not fraudulently to increase its weight, bulk or measure, (2) the drug is the subject matter of a patent in force at the time and is supplied in accordance with the specification of the patent, (3) the drug is unavoidably mixed with some extraneous matter in the process of collection or preparation, etc.

United States of America.—U.S. Pharmacopœia or the National Formulary are the recognized authority under this Act. But the term "drug" as used in this Act inclues, in addition to above, all preparations which are intended to be used for the cure, mitigation or prevention of diseases. . . A drug is deemed to be adulterated when it is sold under or by a name recognized in the U.S.P. or N.F. but differs from the standard strength, quality or purity. Misbranding is punishable, but if the label clearly displays the standard of strength, quality or purity (although it may differ from that in U.S.P. or N.F.) the drug is not considered adulterated (Sec. 6 and 7).

"I propose that for this country there shall be no fixed standard for the purpose of the proposed Act (Cf. Sec. (1) (*b*) U.K. Act). If a drug profess to be of B.P., B.P.C. or any other standard (as shown on label) it must conform to the relevant specifications. In other cases, the labels must clearly exhibit in which respects the preparations differ from the corresponding recognized preparations or what is their special characteristics. In the case of indigenous, i.e., Kaviraji and Hakeemi medicines which, as a rule, are composed of a number of chemicals and herbs, etc., such standardization appears to be impossible. Some control however should be exercised in respect of preparations containing dangerous minerals (e.g., Mercury, Arsenic, etc.), alkaloids, (e.g., strychnina, morphine, etc.), or narcotics, (e.g., bhang, ganja, etc.), while standardization of the simpler ingredients (e.g., reduced iron, copper, etc.), may be attempted.

Misbranding, etc.

"*United Kingdom.*—No person shall sell to the prejudice of the purchaser any drug which is not of the nature or the substance or the quality of the article demanded by the purchaser (Sec. 2).

United States of America.—The criteria for declaring a drug misbranded (Cf. Sec. 8):—

(1) If it be an imitation of, or offered for sale under the name of, another article.

(2) If the contents of the package as originally put up shall have been removed, in whole or in part, and other contents shall have been placed in such package.

(3) If its package or label shall bear or contain any statement, design or device regarding the curative or therapeutic effect of such article or any of the ingredients or of substances contained therein, which is false and fraudulent.

Misbranding should be punishable here also and the criteria for this purpose may conveniently be the same as in the U.S.A. Act.

Labelling (of proprietary and patent medicines)—United States of America Act (Cf. Sec. 8).—The manufacturer is required by the Act to avoid in the label any suggestion, hint or insinuation, direct or indirect, by statement, design or device that may tend to convey a misleading impression. It is his duty to carefully consider if the statements he proposed on his label are strictly in harmony with facts.

This should be introduced here also to check the defrauding of public by misleading labels. It is specially necessary in this country where poverty, ignorance and lack of sufficient number of qualified physicians oblige too many people to have recourse to patent medicines.

Poisonous ingredients.—United States of America—It does not specify the substances that may or may not be used as ingredients but it does require the quantity or proportion of substances like alcohol, morphine, opium, cocaine, heroin, alpha or beta eucaine and the like substances which may have deleterious effect on human system when taken in large doses (cf. Sec. 8).

This section should be adhered to in the case of all preparations.

Kaviraji and Hakeemi medicines may be treated as proprietary medicines within the meaning of the proposed legislation and they must conform to the conditions set forth above with regard to proprietary medicines except under special circumstances.

The Civil Surgeon, Kamrup, Assam, writes:—

"I do not think with the low standards of professional ethics in this country that much good will come of any legislation."

And Dr. C. P. Chaube, M.B., B.S., Delhi:—

"I am of opinion that barring patents, the prevalence of defective pharmacopœial drugs in the market is entirely due to a lack of ethical standards amongst the members of the medical profession, officials or non-officials. I am not including those who pass muster as doctors without any such rights. Leaving them strictly alone no one can honestly deny the amount of loose certification present in recognized quarters, both high and low, the self-dubbed specialists, and the degenerate practitioner out for his pile by maintaining a chemist's shop rather than a dispensary. The lack of integrity in hospital work, apart from private practice, which is the ruling passion amongst officers, results in the subordinate staff being morally undermined, so that when indents are put in the hands of store-keepers without any guidance as to the manufacturer, they are free to choose their own chemists and their own manufacturers. As the stores in hospitals are to be distributed free, no one knows or cares. This statement does not, however, apply to military hospitals. The chemist practitioner likewise concentrates on making the maximum out of the minimum, with the result that chemists are compelled to stock cheap and interior drugs which alone have a sale, and the manufacturers, in turn, are compelled to prepare poorer stuff from sheer competition. I do not say that these traders fail to take advantage of the prevailing drift to increase their own profits still more by an even further lowering of standards than can be generally tolerated.

"But I do feel that the essential problem is greatly simplified if we bear these facts in mind. Are we justified in penalising the manufacturer or the chemist, and burdening them with a blame which is only partly theirs? And if so, whom do we safeguard? The wilfully dense or the intentionally obdurate? Honest practitioners, let me add, can still find a sufficiency of good drugs."

Dr. P. A. Mathew, B.A., M.B., B.S., Acting Professor of Biochemistry, Medical College, Madras, holds the same view:—

"Unfortunately, in India, any man can practice the profession of medicine and he can be his own chemist, druggist and pharmaceutist. It looks to me that more harm to the public is done by quacks than by impure and inefficient drugs, and so long as the first cannot be controlled it will be impossible to control the second. I think that when there is no standard of medical knowledge and ethics, there is no use of regulating the sale of drugs. It will surely be a help to the qulaified man in his professional work, but the quack will remain untouched."

Hence the necessity of registering practitioners, as suggested, among others, by Dr. G. R. Parasuram, Deputy Superintendent, Government Mental Hospital, Madras:—

"So long as anybody in the street (including the hawker cleaning the ears of people for a quarter-anna) is allowed to be doctor, chemist and dispenser—all combined—nothing could be done. Legislation is required to define as to who a medical practitioner is and who a pharmaceutical chemist, whether it be under the western system of medicine or eastern system of medicine. There should be a register of practitioners under each system and each practitioner should register himself under one system or other and a Medical Council to decide the qualifications for registering."

However, Dr. A. S. Paranjpye, Department of Pharmacology, Seth Govardandas Sunderdas Medical College, Parel, Bombay, notes that there are no legal restrictions about medical practice in Germany:—

"There are no legal restrictions about medical practice in Germany and so the only protection to the public against harmful use of drugs and poisons is from the fact—

(1) that certain formalities have to be gone through for the purchase of any one of a number of scheduled poisons;

(2) that certain potent remedies can be obtained only against a written prescription with date and signature of a recognized physician or dentist or a veterinary surgeon (Resolution of the Bundsrat of 13 V 1896).

(3) that for the protection of the public and in the interests of the pharmacists, the majority of the remedies can be sold only by the latter. This law (of 22/1901) gives a list (*a*) of preparations and (*b*) of substances which can be offered for sale or be sold only by pharmacists. These remedies cannot be kept even by medical practitioners with them for the use of their patients unless they have a special permit from the authorities to keep a dispensary, only in places where there is no pharmacy, for the convenience of their patients, but not for profit. (They are to be supplied at cost price.) This law prohibits even the use of clinical samples of drugs supplied by manufacturers if they contain any drug included in the list (*a*) or (*b*).

(4) The so-called maximal doses have been officially fixed for numerous remedial agents;

(5) the composition and the strength of the drugs are regulated by the pharmacopœia."

Unhappily in India, as remarked by A. Kitchner & Co., Chemists, Saharanpur, many medical practitioners open private dispensaries where they not only dispense their own prescriptions but also sell medicines in competition with qualified chemists and druggists:—

"There are a lot of private dispensaries opened by medical practitioners themselves and they sell medicines very cheap. In that, they use all sorts of cheap preparations and inferior quality medicines, also adulterated ingredients, and spoil the trade of honest chemists and druggists. Also some unqualified self-styled doctors (compounders) do the same as above."

That this leads to various kinds of abuse is noted by Mr. A. Selvanayagam, M.P.S. (India), co-opted Member, Madras. While tracing the evil to its source, Dr. V. Rama Kamath, Editor, "*The Medical Practitioner*," Member, Madras Medical Council, suggests that the only way out of the impasse is to impart to medical students the training necessary to qualify them as chemists and druggists.

The Professor of Pharmacology and Therapeutics, King Edward Medical College, Lahore, writes:—

"If possible some sort of control may be exercised over Hakeems and Ayurveds and nobody should be permitted to practise medicine in any form unless he has received training in a recognized institution for a number of years and has obtained a diploma recognized by the State."

As remarked by Dr. Manomohan Ray, Chief Medical Officer, Raj Darbhanga:—

"It has further been noticed that such drugs as quinine, santonine and the like are daily used by Vaids, Kavirajs, and others in different names and changed appearances and when such drugs are used by properly qualified persons it is usually given out by those people that the patient's system is being poisoned by injudicious use of quinine and such other drugs. This is a sort of propaganda work done by them to minimize the effect of western medicines and proper use of them, although they themselves use them in different names and changed appearances.

"Thus I am of opinion that unless such injudicious use of drugs by ignorant people is also stopped by legislation along with the enactment for maintaining the purity of drugs the suffering public cannot have the real benefit of proper treatment. In fact, I think the legislation to control quacks is more important than that for ensuring the purity of drugs."

And in the words of M. N. Ghose, Esq., Officiating Chemical Examiner for Customs and Excise, Calcutta:—

"It is desirable that the practitioners in indigenous medicines in India (I mean Kaviraji and Hakeemi) must have thorough education in their own lines. They may receive education in their own institutions or be apprentices under renowned practitioners. A non-official licensing board should be created, if possible, to issue licences to would-be practitioners. A pharmacopœia of indigenous medicines will be helpful but I am not sure if the time is ripe yet. In any case quack medicines and practitioners must be discouraged."

Captain S. D. Varnian, Retired I.M.S., Rawalpindi, says:—

"In fine, I have to state that frequently rejected drugs from the Government Medical Stores are being bought by Chemists and the same are at times supplied to medical practitioners, and the result is that patients do not derive the same benefit as they should and the doctors get a bad name. In my opinion the rejected drugs in the medical stores should be destroyed instead of being sold to the public. I have noted in my private practice that patients first go to the "cheap doctors" as they call them and when they find that they can't get better even for minor ailments (like malarial ague) by taking two or three bottles, they have come to me; and, when they get better quicker, by paying a little more, they are thankful. I put this down to nothing but impure drugs which do not produce the desired effect. I have found in my practice of nearly fifteen years, that patients do not mind paying a little more for the rapid recovery of health, but the so-called "cheap doctors" though they themselves make more money through ignorant poor Indians (I mean patients), they not only harm the patients in the garb of cheapness, but ruin the good name of the noble Medical Profession.

Which means that the public need education as suggested by M. N. Ghose, Esq., officiating Chemical Examiner for Customs and Excise Calcutta:—

"Now what I think most important in this connexion is that the public may be educated regarding the value of using good medicines and the injury to human health if the medicine is not up to the mark. Otherwise, the legislation will be practically useless. Sufficient public opinion may be created throughout the country for which propaganda work must be undertaken by the local Governments through Public Health Department, Municipalities, District Boards, Local Boards and Union Boards and other local organizations. Government should encourage non-official association of chemists, pharmacists, etc., and help them, if need be, financially in order to improve the standard of medicines and of the existing conditions."

Dr. S. C. Das, M.B., Lecturer in Pharmacology and Materia Medica, Robertson Medical School, Nagpur, is of opinion that:—

"Government should have a model garden for cultivating medicinal plants. All facilities should be given to private enterprise in this connexion including maintenance of an Information Bureaux for people interested in cultivation or manufacture of drugs."

This opinion is shared by Dr. A. C Sen, L.M.S., Delhi:—

"Herbariums of Materia Medica Farms should be established for encouraging cultivation of medicinal plants and herbs on a large scale and ensuring uniformity of quality of drugs cultivated in India."

And also by Hony. Captain Rai Bahadur Dr. Maharaj Krishna Kapur, Lahore:—

"Production of medicinal herbs should be one of the paramount duties of the Indian Forest Departments and Indian Agricultural Departments—This will develop the immense and vast resources of India in this connexion. Punjab soil and Punjab forests are particularly suitable in this connexion. Kashmir State can be made, by example and precept, a great source for the supplies of many valuable herbs—so that India can be easily made not only a self-supported country but can also serve other countries with its products in this line."

Dr. C. Ramanujayya, L.M.S., District Medical Officer, East Godavari, Cocanada, points to another source of danger to the public:—

"Arsenic, mercury, aconite, opium are generally used by men who generally go by the name of quack doctors (those not passed in Indian medicine but who prescribe these drugs). Some of them are impure and also very poisonous. Legislation should be enacted by which poisons should not be prescribed except by qualified men and sale of these should be licensed. When alcohol and opium are licensed it is not understood why arsenic and mercury, etc., should not."

APPENDIX F

Biological products and Organo-metallic compounds

I*

Dr. P. A. Mathew, B.A., M.B., B.S., Acting Professor of Biochemistry, Medical College, Madras:—

"Biological products suffer from the element of commercialism all over the world, and biological products themselves are only in the experimental stage. To quote only one example: Thyroid gland extracts differ very much in potency in the different commercial samples and the standard of potency is different for different companies. India is not particularly suffering from the sale of any spurious biological products and until a definite and sufficient scientific knowledge of the biological products is available it is a bit hard to say whether they are of proper strength at present."

Dr. A. C. Ukil, M.B., M.S.P.E. (Paris), Calcutta:—

"Two categories of biological products are offered for sale in India—

(1) Those imported from abroad.

(2) Those manufactured in India.

"I had once occasion to test the titre of some therapeutic sera imported from foreign countries and I found them to fall much below the titre mentioned on the labels. This might have been due to one of two causes (1) the sera had a correct titre when they were exported from the respective countries and which subsequently deteriorated under Indian climatic conditions, or (2) sera of low titre, which would not be allowed to be sold in their own countries, are purposely dumped into India as a cheap and uncontrolled market.

"I have never had occasion to do a similar test on sera manufactured in India. In the absence of cold storage arrangements in most of the dispensaries, I believe that biological products stocked in various parts of India deteriorate owing to the tropical heat; I have not made any systematic study into the rate of such deterioration, however.

"Besides sera, opotherapic products also come under consideration under this class. Insulin is one of the drugs which has been found to lose its potency in the tropics."

Dr. V. K. Narayana Menon, M.B., B.S., Professor of Biochemistry, Medical College, Vizagapatam:—

"I doubt whether the various biological products, as offered for sale here, actually retain the amount of activity credited to them. This would seem to be impossible from the conditions of storage, etc., obtained in most of the shops. On a few occasions, I had to suspect the quality of both adrenalin and pituitrin. They did not produce the expected result, and I attributed this to the practice of selling old stock which had deteriorated. Recently I found that some samples of insulin got from the market did not possess the potency they should have. In an attempt to demonstrate the hypoglycæmic convulsions in rabbits I failed to produce any change in the animals' condition in 4 to 6 hours by injecting doses varying from 20 to 100 units subcutaneously, intramuscularly or intraperitoneally. About a month ago, I observed that 60 units in one rabbit and 100 units in another intravenously (after 48 hours' starvation and frequent exercise) failed to produce the symptoms associated with hypoglycæmia. In the latter case (100 units) I observed that the blood sugar fell from an initial value of 0·08 per cent to only 0·05 per cent at the end of 3½ hours, and there was no apparent change in the animal's condition. In all cases the animals weighed from 1·5 to 2 Kg. and had been starved for 24 to 48 hours before injecting insulin. On all occasions I used either Boots' or Burroughs Wellcome's product. Making allowance for the resistance factor, the very slow and comparatively slight influence on blood sugar can be accounted for only by a deterioration in the potency of the preparation."

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* Extracts from replies to the Questionnaire.

Dr. S. C. Das, M.B., Lecturer in Pharmacology and Materia Medica, Robertson Medical School, Nagpur:—

"Provided the process of manufacture and the raw materials used are good, I think, biological products manufactured in India should prove better because of the following:—

"(i) They are likely to be more fresh, and freshness is an important factor controlling the efficacy of these remedies.

"(ii) The animals and organisms from which they are made have lived under same climatic conditions in which the patients themselves do. This is especially true of vaccines, which, being made from various local strains, almost approach autovaccines, the ideal thing to be used.

"(iii) Another consideration is that they are usually cheaper (although I would never have cheapness at the cost of efficacy).

"I have got good results from products of some local manufacturers of good reputation, and similar is the experience of some of my friends and colleagues."

Dr. Phani Bhusan Mukerji, B.SC., M.B., Lecturer in Radiology, Prince of Wales Medical College, Patna:—

"The biological products offered for sale in India belong to two classes:—(*a*) Those of foreign manufacture and (*b*) those of country make.

"With regard to class (*a*), my experience has not been one of uniform satisfaction; some of these products give good results but most of them, especially those available in mufassal stations, show indifferent and poor results. This may be due to deterioration consequent upon defective storage or during transit from the country of origin to India or to worthless and careless methods of preparation at source.

"With regard to class (*b*), I can say that biological products prepared by such firms as the Clinical Research Association or the Bengal Immunity Company, or the Calcutta Research Association, or the Bengal Chemical and Pharmaceutical Works, Limited—all of Calcutta—have given uniform good results when my patients could get fresh stock.

"On many occasions, I had to come to the bitter conclusion that the biological products which my patients had procured were not of the proper strength.

"In my opinion the compulsory use of refrigerators by chemists' shops that stock these products should be enforced. It may add a little to their initial outlay but, in view of the importance of the matter, their use should be made compulsory, especially in those towns where electric current from the mains is available to run these refrigerators.

"In some cases, I have found the biological products purchased by my patients in a decomposed condition and, being unfit for administration, they had to be thrown away."

II*

Memorandum by Dr. V. K. Narayana Menon, M.B.B.S., Professor of Biochemistry, Medical College, Vizagapatam, on the possibility of manufacturing biological products in India.

The most important requirement for the manufacture of biological products in this country is the availability of sufficient raw material of suitable quality. There is certainly no dearth of material in this country for the manufacture of the various products. The numerous slaughter-houses provide ample material, which is at present wasted from this standpoint. The materials obtained from these slaughter-houses appear to possess the same essential qualities as in other countries. Since giving my oral evidence before the Committee, I have examined a few of them, e.g., the thyroid gland and the pancreas, with a view to satisfy myself as to their suitability for the manufacture of potent preparations on a large scale. The results obtained amply justify my opinion that the raw materials available here are

* Special memoranda other than those set out in Appendices B and C.

as good as any in any other country. I do not think that special strains of animals are required so far as the manufacture of the common biological products are concerned, such as extract of liver, thyroid, ovary, pituitary and adrenal glands, pancreas (insulin), etc. This point was raised during my examination as a witness, and I was told that several specimens of thyroid gland examined in Calcutta by one of the members of the Committee did not contain any iodine, indicating the desirability of special strains of animals for the manufacture of these products. Since then I have personally analysed in my laboratory here more than a dozen random specimens of sheep's thyroid gland collected from the local slaughter-house. Every specimen was found to contain a decent amount of iodine. The average for a dozen such specimens was 0·4547 g. of iodine per 100 g. of the dessicated gland. This compares favourably with the iodine content of thyroid gland of animals in England.

Similar encouraging results were obtained with the pancreas. Active insulin could be prepared from ox pancreas obtained from the slaughter-house. No attempt, however, was made to determine the content of insulin in terms of units or milligrammes per Kg. of gland substance.

The suitability of other materials like the liver, adrenal gland, ovary, etc., is, I think, likewise unquestionable. Whole liver of animals in this country is found to be effective in pernicious anæmia, etc., it naturally follows that the extract of this, made properly, must also be effective.

It is, therefore, evident that the question of availability of sufficient suitable material is no hindrance for the manufacture of biological products in this country.

There appears to be a widespread belief that manufacture of biological products is a difficult undertaking in the tropics, as the average temperature is much higher than in the temperate countries. No doubt, decomposition or alteration of active constituents, and also autolytic reactions in tissues, are accelerated by the higher temperature of a tropical climate like ours ; and this may be regarded as operating unfavourably on the yield and potency of the preparations, the most favourable temperature for the maximum yield and maximum potency being as near zero as possible. Generally speaking, an average temperature of 15 to 18°C appears to be quite suitable. This can be easily achieved in this country by resorting to artificial refrigeration. Hence the climatic conditions here cannot be regarded as an obstacle for the successful manufacture of biological products. That a few firms in India have started the manufacture of gland products with great success is sufficient testimony to the fact that there is no insurmountable difficulty in such a venture.

The availability of sufficient expert technical labour is of important consideration in this connexion. I feel confident that there will be no difficulty in getting an adequate number of sufficiently qualified hands in course of time to man the manufacturing laboratories when established. If publicity is given sufficiently early regarding the possibility of employment in this direction, I am sure that a sufficient number of well qualified enthusiastic young men will be available in time. Even if it is not so, the question can be easily solved by sending a few selected men for training abroad for a short period. The expense involved in this procedure will be more than compensated for by the possibility of preventing the flow of money out of the country, at least to the extent of the price of imported preparations which appears to be not small at present, and, more than that, by the stimulus for research which is indissolubly connected with the manufacture of biological products, and which this country stands in such need of at present.

As regards the method of control of the various biological products, one has to consider how best the quality of these can be preserved till they reach the consumer. Assuming that those preparations that arrive in this country from abroad, or that will be manufactured here, possess the maximum possible potency and other qualities, the question arises as to what are the factors that contribute to their deterioration. Among the latter are exposure to light and air leading to auto-oxidative processes—long-continued exposure at even the atmospheric temperature leading to inactivation of the active agent, the nature of which is unknown in many cases—

and, especially in the case of solutions, a slow change in the reaction of the medium, probably due to absorption of material from the container, leading in many instances to precipitation of the active constituent, or to a change in its physical characters, such as optical behaviour, without altering its composition. In cases like that of adrenaline such a change in the optical properties is attended with a marked diminution in physiological activity. Hence the method of storage of the various biological products is of primary consideration for the maintenance of their quality. They should be stored in dark cold chambers or refrigerators, and this must be insisted on in the case of firms that stock these products. In all cases, provision must be made for periodical inspection of stocks by a competent authority, and samples that are declared as deteriorated should be condemned, and not allowed to reach the consumer. The same applies to the consignments that are imported from other countries.

This raises the question of the possibility of utilizing the existing bio-chemical laboratories for the examination of the various biological products offered for sale in the market as to their purity and potency. This, I feel sure, can be easily undertaken by the existing laboratories, provided the necessary additional staff and equipment are given.

Closely allied to this is the question of the possibility of these laboratories undertaking the standardization of these drugs by chemical and biological means. The same remark as above applies here also. In both cases, namely, examination of biological products for purity and potency, and standardization of these by chemical and biological means, satisfactory results can be obtained by the close collaboration between the bio-chemical and pharmacological laboratories wherever these exist together.

In conclusion, I confidently feel that, financial considerations apart, there is practically no great difficulty in starting the manufacture of biological products in this country. On the other hand, there is everything in favour of such an enterprise. The consumer will be enabled to get really potent preparations probably at less cost ; a new avenue for employment will be opened; a fresh industry with great potentialities will be started; and an opportunity will be provided for harnessing the Indian talent for biological and bio-chemical research.

Memorandum by Lt.-Col. H. H. King, I.M.S., Director and Dr. C. G. Pandit, M.B., PH.D., D.P.H., & D.T.M., Assistant Director, the King Institute of Preventive Medicine, Madras, on the practice of the King Institute, Guindy, in the manufacture and storage of vaccine lymph.

Season of work.—Large scale vaccine production in the climate of Madras is restricted to the cooler months of the year from October to February because it is found that the quality of lymph produced in the warmer months is poor.

2. *Vaccinifers.*—(*a*) The final vaccinifers are calves less than two years old. Those selected have either white or red coats, for it is found that pigmented skins usually do not yield as good lymph as fair skins.

(*b*) For the production of seed lymph young buffaloes and rabbits are used.

3. Precautions against disease in vaccinifers—

(*a*) *Calves.*—

(i) Only healthy calves are chosen free from obvious diseases and from skin infections.

(ii) Incoming stock is quarantined for fourteen days.

(iii) The calves are obtained from rural areas in Salem district from which bovine tuberculosis has never been reported. So tuberculin tests are not done and the animals are not post-mortemed.

(*b*) *Buffaloes.*—As for calves except that the animals are obtained locally.

(*c*) *Rabbits.*—

(i) Only healthy young rabbits are used.

(ii) They are quarantined for one month before and for one month after vaccination—the latter is necessary to be certain of the absence of encephalitis, etc., among these at the time of vaccination.

4. *Seed lymph.*—The calves are vaccinated with potent seed lymph. This is usually obtained from the best vesicular material on any calf, but, as is well known, lymph when carried on from one calf to another in succession soon deteriorates; so some method of 'rejuvenation' of lymph has to be adopted. It is usual to do so by passage through a rabbit. Since 1922, the method followed by Doctor Nijland in Java has been adopted with slight modifications. Thus lymph from a calf is first passed on to the rabbit. The rabbit lymph is used to vaccinate a buffalo. The lymph from the latter serves as 'seed lymph' to vaccinate a number of calves—calf lymph being the lymph for issue. The potency of lymph is thus maintained by passing the lymph through a continuous and regular sequence of animals. Since, however, it is advisable for various reasons (given in the Annual Report for 1929–30) to have the lymph as far removed from the rabbit as possible another buffalo passage has been added of late to this series, the cycle now adopted being calf, rabbit, buffalo, buffalo-calf. Since its adoption the method has given very satisfactory results.

5. *Collection of lymph.*—The lymph is removed from calves, 120 hours after vaccination. The average weight of lymph collected is 23 grammes. This is not a large yield. The calves used are a very small breed and are vaccinated only on the abdominal wall, not on the flanks as well. The lymph is then well ground and diluted with 50 per cent glycerine water (P.H. 7·6). Lymph is issued usually in a dilution of either 1 in 7, but in the hot weather it is issued in a dilution of 1 in 5.

6. *Potency of lymph.*—Various methods have been advocated to determine the potency of lymph. In 1927 under the Therapeutic Substances Regulations, the Ministry of Health in England laid down the following definite standard of potency for vaccine lymph:—"The thousand-fold dilution of vaccine lymph shall be tested on rabbits and guinea pigs and the lymph from which the dilution was prepared shall not be issued unless the characteristic lesions due to vaccinia virus are produced in the test." In this institute, however, the "vesiculation test" first introduced by Lt.-Col. Cunningham and Major Cruickshank is adopted. Lymph is diluted 500 times and a known quantity of diluted lymph is introduced on calves into linear incisions, the total length of which is noted. The developed vesicles are counted and the result expressed as so many vesicles per inch of linear incisions. It was pointed out at the time that lymph which gave only one vesicle per inch was sufficiently potent to ensure a case success of 90 per cent when used by the vaccinators in the field. As lymph gains in potency, more and more vesicles develop along the linear incisions until finally they cannot be counted. Such batches of lymph are called 'continuous'. Batches where a count was possible were called 'discrete'.

As regards potency, the practice in the institute is to reject all lymph that does not give at least two vesicles per inch in a 1 in 500 dilution on a calf. We think that is as good (and more easily done) as the test recommended by the Ministry of Health. In recent years, all the batches of lymph made in the institute have been showing 'continuous' vesiculation, thus demonstrating in a striking manner the value of Nijland's method in maintaining the potency of seed lymph. For our own information as to comparative values we now test different lymphs in a dilution of 1 in 500.

Again, prior to issue elsewhere, all batches of lymph are, as a rule, issued to vaccinators in the local range which is partially under the control of the institute. This is indeed a great advantage, for it facilitates the study of the behaviour of lymph in the field.

7. *Purity of lymph.*—As regards purity, the lymph must satisfy all the requirements laid down in the Therapeutic Substances Regulations referred to above. Lymph to be issued must be examined bacteriologically and by

animal inoculation and other tests to exclude the presence of pathogenic organisms. These tests are complied with. In many institutions, the lymph is further purified with chloroform or clove oil, but here we find that this is not necessary as, on account of the action of glycerine at the temperature to which lymph is subjected during transit, the lymph as received by the vaccinators is found to be sterile.

8. *Storage of lymph.*—It is well known that heat affects lymph adversely and the deterioration of lymph even at ordinary room temperatures is very rapid. It is absolutely essential, therefore, to store the lymph in cold store at a temperature below freezing. In our experience, temperatures very much below the freezing point are, however, not required for ordinary storage up to six months or so. It is preserved at a temperature of 28° F.—the longest storage of any batch of lymph is eight months.

Memorandum by Dr. L. E. Napier, The School of Tropical Medicine, Calcutta.

During the last ten years, I have had considerable experience in the use of different antimonials in the treatment of kala-azar.

Potassium antimony tartrate was the first antimony salt to be used in the treatment of this disease. It was a drug which was easily obtainable as it was already used in medicine, but it had not previously been used for intravenous injection, so that the commercial samples were not particularly pure. Some of the bad, and in some cases fatal results, which followed the injection of this substance were undoubtedly due to the presence of impurities. The next salt used was sodium antimony tartrate; the better results obtained with this salt were in part due to the fact that it had to be manufactured specially and was, therefore, freer from impurities. Then the scale preparations of the antimony tartrates came on to the market and as by that time I realized fully the dangers of using impure drugs, I strongly advocated that only these scale preparations should be used, because the drug could not be prepared in this form unless a degree of purity, greater than that of most of the ordinary commercial samples, was attained. For some years the scale preparations were almost exclusively employed.

Sodium antimony tartrate is still used for the treatment of kala-azar though much less extensively than before and *I think it important that commercial samples sold for this purpose should be labelled "For intravenous injection" and that all samples so labelled should be of a certain degree of purity (the exact degree is a matter for the chemical expert to settle).*

The next advance in the treatment of kala-azar was the introduction of the pentavalent compounds of antimony by some German chemists in 1916. From 1921 up to the present, samples of these have been sent to India and some of them have been selected by me as giving very excellent results in the treatment of kala-azar. In 1922 Dr. Brahmachari prepared and used in the treatment of the disease a pentavalent preparation, urea-stibamine. In the succeeding years other indigenous pentavalent antimony preparations have been put on the market. At first the price of these preparations was very high, but with the establishment of commercial competition there was considerable reduction in price. The necessity to cut prices forced economy in manufacture with the attendant danger of a falling off in the quality of the drugs. Here was a wonderful chance for dishonest commercial enterprise; any individual could have put into ampoules a soluble brown salt, containing little or no antimony, described it as a pentavalent compound of antimony, called it by some name which suggested antimony and sold it at an enormous profit. Provided it were not actually poisonous, he would probably have been able to sell it for some considerable time, and when it fell into disrepute he could have changed the name and started again. I do not know if this was actually done; I had no personal experience of such a compound myself. But there was undoubtedly a very distinct falling off in the quality of some of the preparations that passed through my hands. In the chemical laboratory in the School of Tropical Medicine a number of samples of urea-stibamine were tested; these samples were made by various local manufacturers and were all reputed to be made accoring to Dr. Brahmachari's original formula, that is to say, they should have contained about 35 per cent metallic antimony. Different samples were found to contain from 19 to 43 per cent of the metal. The toxicity and the

therapeutic quality of the drug varies largely with the antimony content, so that such variations in the antimony content might lead to very serious results, undertreatment on the one hand and overdosage on the other. I have had no experience of the latter; but, in the case of one drug, after getting good results with one batch, I got poor results with a second supply, undoubtedly on account of a falling off in its quality.

My experience of the variations in quality has been confined to indigenous compounds. The imported ones which I have used have maintained their standard; but, I might add, my experience has been only with two of the leading European manufacturers, one English, the other German.

The toxicity of the different pentavalent compounds of antimony varies considerably and so does their therapeutic activity; there is apparently little association between the two qualities. The highly toxic compounds are usually unsuitable for therapeutic use as they can only be administered in very small doses; so also are the compounds of extremely low toxicity, but in this case for the reason that they are often inert. The best compounds fall between these two extremes and have a minimum lethal dose of about 200 mgm. per kilo., given intravenously to mice.

Some drug manufacturers in this country test each batch of the drugs they prepare, both chemically and pharmacologically, but others having tested the toxicity of the original preparation assume that each batch, having approximately the same chemical composition, will have the same toxicity; this is a somewhat risky procedure where antimony and arsenic compounds are concerned as very slight variations in the chemical composition may be associated with very grave changes in the toxicity.

The therapeutic value of a drug can only be tested by clinical trial. It would be extremely difficult to bring in legislation to prevent the advertising of a valueless drug and the making of unfounded claims as to its therapeutic efficacy. This is a matter over which the medical profession can help themselves; no general practitioner should give or prescribe a drug which has not had an efficient clinical trial at some well-known institution. The laudatory remarks of advertisers should not be taken as evidence of the value of a drug.

The doctor should, however, be protected against having sold to him, as a drug the efficacy of which has been established, some other drug of different composition.

The efficacy of most of the antimonials appears to vary according to the antimony content. *No standard for the antimony content, which could be applied to all antimonials, can be laid down, but manufacturers should be compelled to state the antimony content of their drug and to maintain the same percentage (allowing a small margin for normal variation) in all future samples offered for sale.*

Again, no universally—applicable limitations to the toxicity of a drug can be laid down. The dangers associated with toxic drugs is simply a matter of the dose in which they are given. A highly toxic drug might conceivably be given to a patient with advantage, if the dose were sufficiently minute, whereas a comparatively benign one might do harm when given in large doses.

When a drug is placed on the market the toxicity should be ascertained and stated, and all future samples sold should not have a toxicity appreciably greater than that advertised.

Deterioration.—Some antimonials deteriorate when kept, especially when they are not suitably packed.

No antimonial the toxicity of which increases to any appreciable extent when kept should be placed on the market.

It should be made compulsory to pack antimonials in such a way that no deterioration takes place, say, within two years. In the case of those which deteriorate despite good packing, within a given period (longer than two years) *each packing should be stamped "To be used before . . . 193 ", allowing a margin of some months for safety. It should be made illegal to sell a drug when the period has expired.*

Suggestions.—Any legislation should apply both to the locally prepared and imported antimonial drugs. All drugs should be sent to a bonded warehouse, samples from each batch selected by an official, these should be tested both chemically and pharmacologically, and, if they passed the test,

the batch could then be stamped and released. Such testing would be entirely independent of any testing that might be undertaken by the manufacturer in his own interests.

If the organization were in being the actual cost of carrying out the tests would not be great. In the case of a well-established and reliable manufacturers it would only be necessary to test a very small fraction of each consignment. To cover this expenditure a small stamping fee could be charged. A stamping fee of 1 pice per dose would cover expenses and leave a margin, and would not be a large amount for the patient to pay for a guarantee as to the safety of the drug he was using. It would, of course, also be necessary to have inspectors purchasing drugs in the open market to ensure that deterioration was not occurring and that no substitution by the retailers was taking place.

III *

Letter H/O.G., dated 12th January 1931, *from the Manager, Messrs. Parke, Davis & Co., Bombay, to Mr. Brier of Messrs. Parke, Davis & Co., Detroit, Michigan, U.S.A.*

During the course of the examination, the keeping properties of biological products in this country was raised and I was asked if we could furnish definite data on this point and, if not, could we obtain it as it would be very helpful to them in arriving at conclusions as to what recommendations to make regarding expiry dates. We have, therefore, sent the following out-dated biologicals for examination and report:—

2 X bulbs Diphtheria Antitoxin, 2,000 units.
2 X ,, Antidysenteric Serum.
2 X ,, Antistreptococcus Serum.
2 X ,, Tetanus Antitoxin, 1,500 units.
2 X 1 c.c. Gonococcus Bacterin, 1,000 mills.
2 X 1 c.c. Gonorrhœal Bacterin Combined.
2 X 1 c.c. Streptococcus Bacterin.

I may mention that all these have been returned to us by various depots and have therefore been exposed during the greater portion of their potency to normal climatic conditions.

Letter, dated 27th February 1931 *from Messrs. Parke, Davis & Co., Detroit, Michigan, U.S.A., to Messrs. Parke, Davis & Co., Bombay.*

The samples of out-dated biological products referred to in your letter of January 12, 1931, addressed to Mr. Brier, have been received and the samples and correspondence referred to the writer for deserving attention.

We are, accordingly, having retests conducted on Diphtheria Antitoxin, Antidysenteric Serum and Tetanus Antitoxin, and will report to you the results of our tests as soon as the tests are completed.

We beg to call your attention to the fact that there are no recognized methods of testing Antistreptococcus Serum, Gonococcus Bacterin, Gonorrhœal Bacterin Combined and Streptococcus Bacterin to determine their relative potency, hence there is nothing we can do with these samples.

It is our belief, however, that your Government will lean heavily toward the work of Sir Almroth Wright, of London in the matter of dating the bacterial vaccines. We are aware of the fact that Dr. Wright has published his views that certain bacterial vaccines at least are active for a much longer time than our present United States dating of eighteen months. It is also worthy of note that the Therapeutic Substances Act and regulations

* Correspondence furnished by Messrs. Parke, Davis & Co., Bombay, relating to the keeping properties of biological products imported by them into India.

issued by the English Government do not fix any definite limit to the dating on bacterial vaccines, but require that the manufacturers shall stand back of whatever dating they may use. The United States regulations limit the dating on bacterial vaccines to eighteen months, which is the dating of these products which we ship to you and which, of course, must obtain to permit of shipment under United States Government regulations from the United States to another country.

It is to be hoped, therefore, that if the Government of India do definitely legislate to control the manufacture and import of drugs and biological products that the datings they exact on bacterial vaccines will not be less than the present United States dating of eighteen months.

Letter, dated 12th March 1931 from Messrs. Parke, Davis & Co., Detroit, Michigan, U.S.A., to Messrs. Parke, Davis & Co., Bombay

This will supplement our letter to you of February 27th concerning retests on a list of biological products submitted with your letter of January 12, 1931. As stated in our previous communication, only three of these samples are amenable to definite potency tests,—namely Diptheria and Tetanus Antitoxin and Antidysenteric Serum. We have now completed the tests on the samples of these three products which you sent us, and are pleased to report our findings, as follows:—

Diphtheria Antitoxin, Rx. 082892. During the 47 months which have elapsed between the original potency test, which form at the basis of its commercial filling, and the test conducted on March 9th, 1931; this antitoxin has lost 44 per cent in potency, or a little less than 1 per cent per month.

Tetanus Antitoxin, Rx. 079935. In the 44 months elapsed since this was tested for filling purposes, it has lost 45 per cent in potency.

You already know that these containers were filled with 40 per cent excess to carry a dating of three years, which provides for a little more than 1 per cent per month, for deterioration. Hence, our retests on the two samples adequately confirm our United States Government regulations with respect to such excess, and we can do no better than to recommend that the India Government would make no mistake in adopting the United States Government regulations as applying to such products.

Antidysenteric Serum, Rx. 02390. The agglutination test has been repeated on this lot of Antidysenteric Serum in exact accordance with the original agglutination test made on September 8, 1928, and we are pleased to be in a position to state that the results at this time practically duplicate the original results, indicating that this lot of serum has not lost any of its agglutinin titre since that date. However, it must be stated that too much dependence cannot be placed on the agglutination test of antibacterial serums as a measure of their therapeutic value, such a test being recognized as merely a measure of the relative development of immune bodies in the horses producing this serum. The United States Government dating limit on this serum is eighteen months.

Copy of a report received from the Detroit Laboratories of Messrs. Parke, Davis & Co.

Pituitary extract

We have tested the package of Pituitary Extract of Indian manufacture.

This contains only 1·2 international Oxytoxic units per c.c. and only 1·5 of our Pressor units per c.c. These strengths would be respectively 12 per cent and 15 per cent of our standard for Pituitrin Obstetrical. The package labelled "Potent till August 31, 1932" at this time, seventeen months short of that expiration date, is so low in strength that it is wholly unfit for use. One c.c. would give about the effect of 2 minims of our regular Pituitrin.

APPENDIX G

Medicines made from indigenous drugs

In accordance with the second term of reference to it, the Committee has to report how far the recommendations it has made regarding drugs and chemicals recognized by the British Pharmacopœia may be extended to other known and approved medicinal preparations, and to medicines made from indigenous drugs and chemicals. Now indigenous drugs and chemicals may enter into the composition of medicines prepared according to either 'Western' or 'Indian' methods. This section deals exclusively with drugs prepared according to the formulæ and methods generally accepted by the Ayurveda, the Siddha, and the Unani schools of Indian medicine.

I*.

The first thing to be ascertained is whether indigenous medicinal preparations are ever adulterated and, if so, to what an extent.

Rao Sahib Dr. T. S. Tirumurti, B.A., M.B.C.M., D.T.M. & H., Professor, Medical College, Vizagapatam:—

"So far as the indigenous systems of medicine are concerned, the tendency for adulteration of drugs used by the followers of those systems is negligible, as there is no desire on the part of the vendors of those articles to adulterate them to bring down their prices below those imported into the country from abroad, owing to the absence of foreign competition."

There is no doubt that such should be the case if things were as they ought to be, if things were still going as they used to go. To quote Kaviraj Narendra Nath Bidyanidhi, Calcutta:—

"Each kaviraj teaches a number of pupils, makes his own medicines, and dispenses them. He is therefore a medical school, manufacturing and dispensing chemist rolled up in one."

Ayurvedachariya Pandit Harinarain Chaturvedi, Principal, Government Ayurvedic School, Patna:—

"Ayurvedic physicians generally prepare the medicines in their own houses under their own supervision, hence they have no occasion to think that their patients get medicines of defective strength and of impure quality. The raw materials which are used in the preparation of medicines are generally obtained either from the jungles or from the market. It is possible, in some cases, that materials sold in the market may be of impure quality and of defective strength but attempts are made by the physicians to avoid such materials as far as practicable."

But, though vaids and hakeems may still be their own manufacturers and prescribers, they unhappily are no longer their own collectors and suppliers. As expressed by Dr. Lakshmipathi, Medical Practitioner, Madras:—

"What is required now for giving a scientific foundation for Indian pharmaceuticals is not so much the biological and chemical assays and analyses that are followed for the preparations included in the British Pharmacopœia; but, more urgently, the careful identification and wise classification of the several hundreds of every valuable medicinal plant drugs that flood the market and are used extensively by Indian physicians. As long as the Indian physicians selected with their own hands the particular drug they wanted to use under definite instructions for proper identification, secured by personal contact with the teacher or guru, it was a different matter. Now, the tendency unfortunately for the supplier and the manufacturer of Indian medicines is to be different and distinct from the practising physician. Under the circumstances it is essential that the quality of the drugs used in the preparations should be carefully scrutinized.

"As the managing director of a manufacturing concern, I had occasion, some time back, to call for tenders for the supply of 480 lb. of trivruth (*ipomœa turpethum*). I received several samples with tenders out of which

* Summary with reference to answers and memoranda other than those set out in Appendices B and C. Figures in brackets represent the number of witnesses.

I selected one and placed an order for the required amount, which was supplied. Six months later, it came to light that the drugs supplied had been adulterated with another root (though happily innocuous) and I had to burn away the remnant of the drugs worth Rs. 600 for fear that it would get into the market if I did not destroy it.

"Again *talisadi choornam* contains also 6 per cent vamsalochana according to the prescribed test, and the cost of vamsalochana ranges from Rs. 3 a lb. to Rs. 10 depending upon the quality. An unscrupulous manufacturer, who makes medicines, may omit vamsalochana altogether, or add vamsalochana of an inferior quality, or substitute vamsalochana with a drug called *tavakshi*, a kind of starch derived from a bulb. This makes all the difference in the cost of production and he may certainly compete with a reliable manufacturer very easily. It is very difficult to detect his omission or adulteration. To my knowledge this is done in some cases.

"Moreover, with the boom of Swadeshism, and the acknowledgment of Indian medicine as having a scientific basis, there arose, in imitation of foreign concerns, a number of manufacturers of spurious preparations, intent upon making money by the sale of several proprietary medicines with secret formulæ."

The modern Ayurveda Pharmacy may be better described in the words of Dr. Saileswar Banerjee, Visak-Sastri, Jagatbandhu Ayurvedic Aushadhalaya, Chatra:—

"Like other Ayurvedic firms my firm does not import any drug or chemical from outside India, nor does it use any drug or chemical prepared in India according to Western methods.

"I use herbs as well as some minerals, viz., mercury, borax, nitre, sulphur, iron, silver, gold, mica, zinc, copper, etc., some chemicals—like sulphate of iron, sulphate of copper, etc., a few arsenic and antimony compounds, and few liquid preparations some of which contain a little alcohol (not more than 5 per cent). Mineral acids are seldom used. Metallic oxides are used, but they are prepared according to Ayurvedic methods. Vaccines and sera are never used.

"All the medicines I use are prepared by myself. Analytical tests or biological controls of my preparations are done according to Ayurvedic methods. (Here I beg to state for your information that flesh, bile, urine, fat and such other things of some animals are greatly used in our medicines.)

"Poisons such as arsenic, copper, sulphate of copper, zinc, aconite stramonium, nux vomica, etc., are used, but, according to the peculiar methods. (Here I beg to state for your information that flesh, bile, urine, used by Allopaths.) Lethal doses of these things are unknown to us."

It may then be admitted that, contrary to time-honoured custom, the modern vaid and hakeem follows the example of his Western confrere in that he depends on others not only for his supply of raw materials, but to some extent also for the compounding of his prescriptions and the preparation of his medicines. And since Ayurvedic and Tibbi pharmacies have come to stay the Government has, in the interest of the majority of the Indian population, every right to enquire into the strength and purity of their drugs and medicinal preparations. That every thing is not what it should be is amply borne out by the evidence, written as well as oral, placed before the Committee.

From Pandit Surendra Mohan, B.A., Principal, Dayanand Ayurvedic College, Lahore:—

"Pansaris sell impure and adulterated raw materials. In the case of many Ayurvedic herbs, they are not procurable in the Punjab bazaars, and have to be sent for from hills or other provinces, as Bengal and Madras, etc.

"Standardization of well-known Ayurvedic preparations mentioned in A.V. Text is desirable, but it is almost impossible under the present circumstances, owing to multifarious difficulties of procuring pure raw materials. Sometimes certain ingredients, unavailable in the markets, are omitted from the prescriptions, and in some cases certain ingredients, not mentioned in the text, are added to the medicine to increase its activity."

From Hakeem Khwaja Shamas-ud-din, Municipal Commissioner, Lucknow:—

"So far as Unani indigenous medicines are concerned, I, as a hakeem, am of opinion that these are largely adulterated and sold of defective strength, impure quality and potency throughout the country."

From Hakeem Muhammad Yusuf, Calcutta:—

"The Unani and Ayurvedic preparations bought from the ordinary baniah or attar shops (i.e., shops of indigenous medicinal drugs of persons without any knowledge of these systems of treatment), of which there are any number in every town, are inactive and sometimes useless. Such medicines might not be positively harmful, but certainly they delay the cure and frustrate the very idea of treatment. So in that sense they are injurious. Imitations and adulterations are not infrequent."

From Hakeem-ul-Ummat Allamai Hindi, Calcutta:—

"The drugs generally as I find for sale in the Calcutta market and also in several other places are impure. In several cases the genuine drugs are not available and some sort of substitutes are sold; they are not properly preserved and kept by those who offer them for sale. In several cases old drugs devoid of all potency are sold.

"I have inspected medicinal preparations purchased by my patients and have found (1) in several cases, on analysis, that the preparations do not contain all the drugs which have been fixed as the standard for that preparation; (2) in several cases the weight of the drugs according to the standard fixed is not present; (3) the drugs themselves which go to make up the preparation are very old and impure as can be found on an inspection thereof; (4) in several cases other drugs are found in such preparations and (5) the process of preparation is also defective."

From Hakeem Moulvi Muhammad Abdul Halim, Lucknow:—

"From a long time there is a great complaint in the public, accustomed to undergo the indigenous system of treatment, against the inefficiency of the medicines supplied to them and it is only on account of the correctness of the complaints that a learned hakeem so often feels ashamed. Till now, no attempt was ever made on behalf of Government or other public bodies to put an end to such irregularities and dishonesty; but as the Government now contemplates to adopt some restrictive measures, it is a duty of all cool-headed hakeems to help in this noble task, and thus guarantee the efficiency of the treatment on one hand and save the country from untimely death on the other.

"Some famous hakeems individually tried their best to check the growing deficiency of medical market and started their dawa khanas claiming to supply good materials, but I am bold enough to say that their efforts, though valuable, could not achieve success. As for instance the late lamented Hakeem Ajmal Khan of Delhi started his illustrious Hindustani Dawa Khana and my uncle, the late Hakeem Hafiz Abdul Ali, his Makhbanul-Advia, but in spite of these two well-managed firms, one always feels great difficulty in purchasing reliable medicines. I shall go further and say that even these two firms cannot reasonably claim the purity of their stocks; obviously because they do purchase the medicines from pansaris (dealers of indigenous medicines) who do not know the methods of storing according to formulæ written in our books and are greedy enough to continue selling, even knowing their deficiency, simply to gain greater benefit and save the damage of putting them aside, after expiry of their periods; and because they do engage untrained dawa sazes (compounders) who do not know the principle and formulæ of pharmacy.

"Caliph Marwan and Azaduddaula, the two knowledge-famed monarchs, so much financially helped the hakeems of their kingdoms that some of our brethren travelled along Asia, Europe and Africa and tried a lot of herbs, and thus came to know the hidden properties of these botanical products. This practice was set aside owing to State refusal to grant pecuniary aid. At present the hakeems only know the names and the attars do what they like.

"The attars being fond of purchasing cheap medicines totally ignore quality. As for instance Banafsha (violet) is found of several specimens varying in price, that is, from Re. 1 per seer to Rs. 10 per seer. I can say with full authority that there is a great difference between the efficiency of

all these varieties, and the precious one is more efficient than others. But the dealers always supply inferior instead of superior quality. As for the compounds, the dealers always prefer to prepare them from these low quality drugs, and, consequently, they prove less efficient than what we expect of them."

From Dr. Abdul Ali, B.SC., M.B.B.S., Lucknow:—

"I have the honour to say that as I have been practising as a hakeem long before I took my degree of M.B.B.S., I have got some practical experience of indigenous drugs.

"We find in our daily practice that most of these preparations are inactive. This is due to the following reasons:—

(1) Pharmacists use drugs of inferior quality improperly stored for a long time.

(2) They substitute stems for roots and leaves for flowers and sometimes they substitute one drug for another which is either not found in the market or costly.

(3) They omit those drugs which are either costly or not found in the market.

(4) They use costly drugs in less proportion."

From Vaidyabhushan Purushottamshastri Hirlekar, Amraoti:—

"A number of indigenous (Ayurvedic) pharmacopœial preparations manufactured by native pharmacies are not found to be of the required potency, and this is mainly due to the inferior quality of drugs used by them as also due to want of proper care in their preparation.

"Being afraid of this drawback of these preparations, I generally do not use such preparations in my practice and consequently I cannot give any details of my experience. It can, however, be easily proved that such preparations on the Indian market are not properly manufactured and are not found to be up to the mark in their prescribed properties."

In the course of his oral evidence Rasayanacharya K. Pratab Sinha, Superintendent of the Ayurvedic Pharmacy, Benares Hindu University, most emphatically denounced the vegetable drugs sold in the bazaars which, he said, were very bad and often not what they are supposed to be. This view was also shared by the vaids and hakeems of Bengal, Bihar and Orissa, the United Provinces, and the Punjab who appeared before the Committee.

It is, therefore, abundantly clear from the evidence that some of the indigenous drugs sold in the bazaar and used by professionals in Indian medicine are inferior in quality and defective in strength. The situation is such as to call for control, legislative control.

Legislation is advisable; is it possible?

To quote Captain P. De, B.SC., late of I.M.S., M.B., M.R.C.P., Officiating Professor of Pharmacology, School of Tropical Medicine and Hygiene, Calcutta:—

"In India several systems of indigenous medicine are in vogue and the methods of preparation and administration of drugs in all these systems of medicine are quite different. Hence it is difficult to standardize their drugs and preparations. Without any definite standard to work upon, efficient control over them, I am afraid, will not be possible. But the fact cannot be ignored that the indigenous medicines require standardization and control in the interests of the consuming public. The practitioners of indigenous systems of medicine sometimes use very potent and poisonous remedies like opium, arsenic, mercury, etc., hence, if these are left out of the Committee's recommendations, adulteration will go on unchecked under the garb of indigenous medicinal preparations and the very object for which legislation is going to be enacted will be defeated. Therefore, I think, drug legislation which aims at controlling the drugs recognized by the British Pharmacopœia without touching the indigenous systems is not likely to work well in India. Certain indigenous drugs have already been worked out by research workers in different parts of India and several others are there whose chemistry has been worked out though the pharmacological actions have not yet been outlined. All these indigenous drugs could be brought under control by laying down standards which will have to be followed by practitioners of all these systems."

And Dr. K. Venkatachalam Pillai, Acting Professor of Pharmacology, Medical College, Madras:—

"Standardization of indigenous drugs and remedies is highly desirable from the point of view of both the practitioner and the patient. The practitioner will thereby be brought to place confidence in the clinical efficacy of the standardized drugs and satisfy himself that their use will not be followed by disastrous results on account of overdosage. Economy, freedom from danger and certainty of cure will also be vouchsafed to the patients.

"But standardization pre-supposes a compete knowledge of the chemistry, pharmacology, and therapeutics of drugs. This, unfortunately, is not known in the case of a great number of indigenous drugs and if their usefulness as therapeutic agents and their proper place in the economics of this country are to be realized and made use of, then it is high time that steps are taken and co-operative efforts are made to systematically and scientifically study these drugs in well-equipped laboratories with specially trained workers in the various presidency centres in this country. If this is not done early enough, many of the really valuable indigenous drugs may be lost to us for scientific medical use.

"There are a good many of ineffective and harmful remedies among the indigenous medicines, but it is possible, as has been observed before, that there are also others of high therapeutic value which are just now lost inextricably in the morass of the useless and the dangerous kind. Unless and until the following essential conditions are brought about it will be neither wise nor practicable to control the sale and use of indigenous drugs by unscrupulous and unqualified persons who trade on the credulity of the ignorant and believing public:

(1) The useful remedies among the indigenous drugs should be sifted from the bad and useless ones by proper scientific study and they should be incorporated in the Pharmacopœias and made official drugs.

(2) The dangerous drugs, which will be of therapeutic value if properly prepared, must be carefully standardized and rendered innocuous and fit for medical use.

(3) The useless and supposed therapeutic remedies must be demonstrated as such.

"When these requirements are satisfied, and useful drugs from among the indigenous remedies have been discovered, as a result of critical scientific study, and after they have been made official and classified as therapeutic agents, then it may be possible by legislative means to control the sale and use of ineffective and harmful indigenous drugs."

Mr. R. L. Sethi, M.A., B.SC., I.A.S., Economic Botanist to Government, United Provinces, Cawnpore:—

"The standardization of indigenous medicines is very essential. The active principles of the herbs vary not only in different stages of plant growth, but also in different parts of the country. Often different plants have one common name, and it is difficult to select the genuine one. A survey of the medicinal flora for locating the right type and condition of the herb is a necessary preliminary. For instance, there are fifty types of 'makaradhwaja', but it is very difficult to select the right one. All preparations must pass a standardization test before being allowed to come into the market."

But, as remarked by Dr. Frank Noronha, M.B.C.M., D.P.H., Superintendent, Mental Hospital, Bangalore:—

"The material used by the indigenous practitioners is derived from every source in nature, animal, mineral and vegetable, and, in many cases, the nature and quality of the material used is known only to the person who dispenses it. To control the use of such material by the application of scientific principles is a formidable affair."

As evidenced by the replies received (321) to question 7 of the questionnaire regarding the standardization of various preparations made from drugs used in the indigenous medicines on the Indian market, the question has been interpreted differently, and a few witnesses (29) taking it to refer to Ayurvedic and Hakeemi preparations deprecate standardization as either impossible (10) or inexpedient.

Says Kaviraj Amrita Lall Das, Principal, Jamini Bhushan Ashtanga Ayurvda Vidyalaya and Ayurvedic Arogyasala, Calcutta:—

"The very subject has been engaging the attention of my colleagues and myself for some time past, and we have found the problem of standardization to be a most difficult one to solve. The Ayurvedists maintain, rightly or wrongly, that chemical analysis is not all according to their science, but that there is something else much higher and beyond such analysis. They hold further that at present there is no scientist who can sit in judgment to decide the issue.

"However, we have gone sufficiently deep into the matter to emphatically declare that in our deliberately considered opinion the time is not ripe yet for taking up the question of standardization of indigenous drugs and chemical preparations, and any such attempt would be a set-back to medical progress. At the same time it is desirable that steps should be taken to assure the purity and genuineness of the raw materials which form the ingredients of these preparations.

"We think that the Eastern medical science cannot and should not be weighed or measured by the scale of the West if justice is to be done to the former, the future science of the world."

And B. S. Mozumdar, Secretary, Berhampur Medical Association:—

"We do not feel any necessity for standardizing various preparations of drugs used in the Indigenous Medicines, as without it they have proved useful and beneficial for several decades.

"But only those indigenous drugs and their preparations can be standardized, on which real research has been made and which after research has been found not safe to be used without standardization.

"Interference with all the drugs will be rather harmful. An illustration on the point may be mentioned here. Interference by Excise Law has very nearly succeeded in wiping out of market the most useful Ayurvedic spirituous preparation, 'Mrita-sanjibani,' a medicine stimulate and tonic of real worth and age-long reputation, which is as good as, if not superior to, the tonic wines imported from abroad."

To quote Dr. A. S. Paranjpye, Department of Pharmacology, Seth G. S. Medical College, Parel, Bombay:—

"Probably this question refers to the preparations of 'indigenous' drugs made according to 'Western' methods (as tinctures, extracts, etc.), If so, and if the drugs are potent drugs, the preparations must be standardized. Some years ago, when I was practising, I had received such preparations of kurchi and papaya but these were found to be inert and useless, as they did not show any of the known actions of these drugs. Even if an 'indigenous' drug is found pharmacologically active, the preparations sold in the market may not be active and may be put on the market merely and dishonestly for the exploitation of the scientific results published. It is desirable that standards for such drugs be recommended.

"On the other hand, if this question refers to preparations made according to 'Ayurvedic formulæ and method,' there are great difficulties to be overcome before standardization would become possible. Such preparations are now manufactured by many firms on a large scale but it is not known whether they are all equally active or differ in their actions, if any. Any attempt to control these preparations will be interpreted by the interested parties as an attempt to suppress the indigenous systems. Still, even in the interests of practitioners of indigenous systems who do not make their own preparations, some sort of standardization would be desirable; and with their co-operation a Board consisting of 'indigenous practitioners' should be constituted. Such a Board with the assistance and services of chemists and pharmacologists, offered by the Government, whenever required, will work out certain standards to be gradually laid down and enforced and this is one of the ways in which the Government can help (the progress of) the 'indigenous systems' to approach and become scientific."

Though personally in favour of some check being put upon the preparations of Ayurvedic medicines, Dr. Girindra Nath Mukerji, Editor, The Journal of Ayurveda, writes:—

"For the present, indigenous medicines and their preparations need not be interfered with. The formulæ of Ayurvedic preparations are not secret—their ingredients, measure, and method of preparation are clearly written in their text-books. As a rule the Ayurvedic physicians use drugs and plants according to their theory and practice; isolation of active principles of medicaments would not fulfil their requirements. No definite standards of their drugs are available. They use drugs which grow upon the soil of India; they consider fresh products made locally more efficacious than modern tinctures and extracts. Minute and queer directions are given for collection of drugs, their storage, and preparation, which are not intelligible to us. To standardize Ayurvedic medicines by legislation would be to strike a death-below to the science as we find it to-day."

This view, however, is not shared by Dr. Rao Sahib T. S. Tirumurti, Professor, Medical College, Vizagapatam, who believes that standardization may eventually lead to a greater demand for and consequently an increased sale of indigenous preparations:—

"Standardization of preparations made from drugs used by practitioners of the indigenous systems of medicine according to the allopathic pharmaceutical methods will probably not affect the sale of these drugs in the Indian market to any extent, for the reason that such standardized drugs are not or will not be made use of by the practitioners of indigenous systems. The market which caters to the needs of the allopathic practitioners is different from that resorted to by practitioners of other systems. It is possible that the sale of indigenous drugs will be greater, when they are wanted both by allopaths and non-allopaths, who will use them in the ways to which they are trained."

Not a few (38) consider standardization desirable in view of the compilation of an Indian Pharmacopœia.

51·5 per cent of the witnesses (287) never use indigenous drugs and 38 per cent use them but little. Practitioners who largely depend on indigenous preparations are to be found in the United Provinces and in Bihar and Orissa where they represent percentages of 42 and 39, respectively.

Of the 345 witnesses who have sent answers to question 8 of the questionnaire—as to the possibility of control over indigenous preparations in the same way as pharmaceutical preparations and whether there were cases where such preparations were proved to be inactive or harmful—223—64·6 per cent—declare that they are not aware of any cases where such preparations were proved to be inactive or harmful; 45—13·1 per cent—consider such preparations inactive; and 77—22·5 per cent—condemn them as harmful.

As noted by S. N. De, M.SC., B.SC., Exporter, Importer and Manufacturer, Calcutta:—

"It is quite possible that the preparations may be inactive for not using standardized drugs. But they cannot be harmful as the roots, herbs, etc., are used as a whole in small doses and not their active principles as in pharmacopœial preparations."

But unhappily a number of ignorant quacks pose as vaids and hakeems and they are the kind of people who freely prescribe arsenic, mercury, croton oil, strychnine, morphine, etc., as complained of by the witnesses from the Punjab and the Madras Presidency where as many as 42·8 per cent and 38·6 per cent, respectively, are aware of cases of poisoning following upon the administration of indigenous preparations. In the words of the Medical Superintendent, Arthur Road and Maratha Hospitals, Bombay:—

"Lots of preparations—such as arsenic, mercury, and purgatives are given without proper dose and standardization and the results in many cases have been disastrous. Phthisis cases have flared up—syphilitic cases also made worse and fatal diarrhœas have occurred."

One hundred and ninety-eight replies out of 318 favour control in the same way as for pharmacopœial preparations. On the other hand, 112 consider such control not only difficult but even impossible. To quote Major B. Sahai, I.M.S., Kohat district:—

"I do not think it is possible to control indigenous drugs in the same way as the pharmacopœial preparations, for the following reasons:—

(*a*) Most of these are used in a crude state in much the same manner as herbs by the herbalists in western countries.

(*b*) The active principles of most of these drugs are not known; so standardization is not feasible.

(*c*) The indigenous therapeutic agents are derived from such a multitude of sources as to render a knowledge of their chemistry a herculean task, unless extensive and exhaustive research is instituted all over the country for the purpose."

Twenty-seven are of opinion that no control should be resorted to unless an Indian Pharmacopœia has first been compiled.

If standardization of indigenous drugs is to be made the *sine qua non* of their control, little help, if any, is to be expected from Western scientists. Let us then turn to the professionals in Indian medicine and see what they can do in the matter.

The optimistic note is sounded by Rasayanacharya K. Pratab Sinha, Superintendent of the Ayurvedic Pharmacy, Benares Hindu University:—

"*Q.*—You know that the Government of India have appointed this Committee to go into the question of inferior quality of Western drugs on the market and, if we find that the drugs are really inferior, then to suggest some legislation for control. We want to ask you if the same is the case with your drugs. You are properly qualified, but there are a large number of practitioners who have got no qualification. From your point of view, do you think that control is necessary?

A.—Yes it is urgently necessary.

Q.—How would you bring about that control? In the case of pharmacopœial drugs, we have got standards and medicines can be tested. How can we do it in the case of your drugs?

A.—It is very easy. We have got standard prescriptions and we know the particular drugs used.

Q.—But, sometimes you mix 20 or 30 drugs?

A.—You can find out by physical tests.

Q.—Do you think that it will be possible to determine by physical tests alone as to what constituents the preparation contains?

A.—Yes, to a large extent.

The witness made a statement in Urdu and the Chairman gave the gist of it in English as follows:—

He has been working for the last five years in the Benares University and during that time he has brought together a large number of drugs and actually identified them. He said that in their books there are standard prescriptions which they used and that it ought to be quite possible, from the physical characters of these medicines or solubility in water, turpentine or alcohol, to determine whether the thing is genuine or not. He suggested that control should be brought in regard to these drugs also. The vegetable drugs sold in the bazaars were very bad and often not what they are supposed to be.

As regards the minerals, they chiefly use things like *lohabhasm*—prepared iron, silver or gold—and he said there is no difficulty about their identification. Chemical tests can be easily worked out for them.

Other witnesses are less sanguine. Thus, Hakeem Muhammad Kasim, Member, Indian Medicine Board, United Provinces, Secretary, Anjuman-i-Muinul Tibbi (Registered Association of the Hakeems of the United Provinces), Lucknow:—

"The condition of Unani chemicals and drugs is not much better than that of Allopathic ones; consequently the need for legislation is as urgent in respect to them. But unfortunately it is not at present possible to do so mainly for two reasons.

"Firstly, Unani chemicals and drugs are prepared from plants, roots, herbs, etc., which have not, as yet, been chemically analysed and their medicinal properties are unknown. It would therefore be impracticable to chemically analyse preparations of Unani ingredients, and it would be impossible to pronounce on their potency and purity and otherwise.

"Secondly, there is no standard pharmacopœia of Unani medicines. 'Qarabadin' which serves the purpose of an Unani Pharmacopœia is not always closely followed by the hakeems. They often diverge from the original formulæ and introduce their own changes. They do it sometimes for good reasons. It is therefore possible that the same pharmacopœial preparation made by one hakeem may differ in its ingredients (or in the proportion of the ingredients used) with the one sold by other hakeems. Until and unless a pharmacopœia is standardized it is extremely difficult to bring under any control the production and sale of Unani pharmacopœial productions."

From the Zandu Pharmaceutical Works, Limited, Bombay:—

"We are manufacturers of Ayurvedic preparations and as such are willing that Ayurvedic medicines should be standardized, but we are convinced that they must be so standardized on the lines of Ayurveda only, subject to the following remarks:—

"We ourselves have introduced reforms in the manufacture of Ayurvedic preparations and we are proud to say that we are pioneers in such reforms.

"Generally, the formulæ of Ayurvedic medicines are found in old Sanskrit books; but there has not been an agreement between the vaidyas of various provinces about the identification of doubtful drugs. One drug is known by several names and one shastric name of a drug connotes different drugs, in different provinces.

"The All-India Ayurvedic conference which had twenty sessions, up to now, has been investigating in the matter, appointing Committees to ascertain identification of doubtful drugs and is seeking an agreement between the physicians of India.

"Various books by botanists, vaidyas and doctors are helping to ascertain the identification of indigenous drugs.

"But all these attempts have not achieved desirable results as yet.

"The physicians have also not come to an agreement with regard to the appearance, colour, taste, etc., of the compounds and nothing has yet been decided which would be acceptable to the whole profession.

"We are aware that the bhasmas have been analysed by chemists; but such analysis would not help the vaidya inasmuch as it cannot detect the putas, bhavanas, etc., which have special value for vaidyas.

"For instance, the abhrak bhasma prepared with 50 putas and another prepared by 1,000 putas will give the same analytical results but the physicians urge that both articles vary in efficacy to a very large extent. We, therefore, maintain that no Western chemical test would be applicable to Ayurvedic preparations.

"In this connexion we would stress the point that, even in the case of Western medicinal preparations, chemical standards alone do not establish the standards of medical efficacy unless and until such efficacy is proved by physiological animal experiments and actual practice on human beings as is definitely proved in the case of many Western medicinal preparations time and again.

"We ourselves have introduced many reforms in the manufacture of Ayurvedic preparations as mentioned before and welcome any further reform compatible with our system. But the inherent difficulties in introducing standardization in Ayurvedic system are almost insurmountable, and the real solution of this important question would appear to lie in the direction of a creation of a Representative All-India Ayurvedic Vaidyas Committee to enquire into and suggest Ayurvedic standards which could in future be applied with a view to keep up the purity of the Ayurvedic preparations."

The truth is that, in the case of compounded indigenous preparations, which form no less than nine-tenths of the indigenous therapeutic arsenal, standardization is an impossibility. But, says Dr. Ramjeedas Bajoria, Calcutta:—

"So far as the shastric medicines are concerned, that is to say, medicines mentioned in the Ayurveda, if the formulæ and method of preparation laid down in the books are strictly followed, the proper standard is obtained and it will not be incorrect to say that the books thus lay down the standard for them and no other method of standardization is necessary. All that is necessary is to ensure that the formulæ and the methods of preparation are carefully followed."

Unhappily vaids and hakeems have not only given up collecting their raw materials, but have also stopped preparing their medicines. In the words of the same witness:—

"It is a matter of common knowledge that many Ayurvedic practitioners who manufacture the various kinds of medicines themselves for their dispensaries maintain but a small establishment of a few servants of the menial class and these servants (with the assistance of young students where there are any) generally prepare the medicines. The practitioners being busy with their patients have little time to spare to look after the manufacturing work. My experience of the conduct and management of the Ayurvedic department of this hospital has convinced me of the efficacy of Ayurvedic medicines if prepared in the right way, but their preparation is not an easy task and, I fear, cannot be left in the hands of ordinary servants or amateurs without running the risk of impairing their quality."

Nay more, not a few professionals in Indian medicine "keep English drugs because the medicines used in the indigenous systems take longer time to prepare and in order to avoid delay they use the ready-made Western medicines."

In his presidential address at the 21st All-India Ayurvedic Conference, held at Mysore in December 1930, Mahamahopadhyaya Kaviraj Gananath Sen Sharma, Saraswati, Vaidyasagar, Pranacharya, M.A., L.M.S., said *inter alia*:—

"It is well known, at least among ourselves, that some Ayurvedic physicians, even of the most orthodox type, use a few Western medicines under the garb of Ayurvedic names. I disapprove of this action as such physicians have not made a full and regular study of the action of these drugs. Let us learn before we prescribe and be honest and frank and have the courage to openly advise our patients to take a few doses of quinine where quinine is necessary or an injection of morphine and atropine when the patient's pain must be immediately relieved."

How far orthodox vaids may unconsciously wander away from the path of orthodoxy is illustrated by the suggestions sent to the Committee by Pandit Surrendra Mohan, B.A., Principal, Dayanand Ayurvedic College, Lahore:—

"I submit herewith three more suggestions about the improvements of indigenous systems, arrived at in consultation with Pandit Thakur Datt, Proprietor, Amrit Dhara, Dr. Asa Nand, M.B.B.S., and Dr. Shankar Dass, B.SC., M.B.B.S., Professors of our College, after the visit by the Drugs Enquiry Committee to this College was over.

(1) All qualified vaidyas and hakeems should have facilities for obtaining alcohol, opium and other articles of excise and at reduced rates for the use of medicinal preparations, as in the case of Allopathic practitioners.

(2) All qualified vaidyas and hakeems should be allowed to purchase and use 'poisons'.

(3) There should be no ban on the advertisements of Ayurvedic medicines till the Government constitutes a Board of Indian medicine in every Province, or makes real efforts to revise the ancient systems of medicine as it does in case of Allopathy."

But the great drawback of the indigenous medicine is to be found in the thousands of quacks who parade in the villages under the names of vaids and hakeems. The letter of Dr. K. S. Rangaswami, Rural Dispensary, Modawaram, Cuddapah, on this point is pathetic in its simplicity:—

"I may not be an expert to give you any evidence yet I take the liberty to write a few lines to bring to your kind notice the experience I had in rural parts, which I request you to kindly go through in the midst of busy enquiries.

"With reference to Dr. Rama Kamath's evidence, *Hindu*, 18th October 1930, page 5: 'Even in systems other than Allopathic it must be made compulsory that nobody should be allowed to treat human ills unless he got a licence from the Government.' At cities and big towns people are educated sufficiently to understand good from bad and they naturally go for the best medical aid either Allopathic or Ayurvedic. But in villages there are many quack doctors practising without any medical education. (Many do not know even to read and write.) They treat cases with few Indian herbs as decoctions and powders, but thanks, many of them are harmless to life except few. Taking the mineral side, they use mercury and arsenic without proper purification and the favourite medicine being 'sowveera mainam' for all diseases; with the result that many get the poison. Even the symptoms of such poison, the quacks tell the patients' people as the new symptoms of that disease. Few cases that come to me in the last stage with such poisons had their days end. There is nobody to question them. For about 30 to 35 villages, this is the only rural dispensary, but there are 30 to 50 quacks going about from house to house with such dangerous drugs. Propaganda, I started against such treatment but there is anti-propaganda by them and it will take some years for them to believe scientific treatment. There are many places like this getting such dangerous treatment. Any medicines prepared according to shastras are useful.

"It will be of divine gift to the country and the suffering humanity if the Committee, side by side, take up the question of prohibiting such quacks from practice; and allow only persons with licence from Government."

Or, in the words of Hakeem Ghulam Kabir, Shefakhana-i-Kabir, Calcutta:—

"It is extremely necessary to bring both the physicians and manufacturers of drugs and medicinal preparations under one complete control. This would be rendering a useful service to Indians. The manufacture and preparation of drugs and medicines should be confined to those who have received regular training in a *Tibbi School* of medicine or under the guidance of hereditary physicians.

"If we are to adhere to the true spirit of Ayurveda, Sidha and Tibbi, the need of controlling the manufacture of drugs and medicinal preparations does not arise. The true vaid or hakeem is supposed to use fresh juices, infusions, decoctions, etc., so that all tinctures, extracts, syrups, etc., of indigenous drugs found in the market must *ipso facto* fall within the class of Western medicines and be treated as such—as pharmacopœial preparations if standardized, or, in the absence of a standard, as proprietary preparations or patent medicines according as the composition is divulged or kept secret. Again, any vaid or hakeem true to his profession relies on the experience of his forefathers and on his own and collects the drugs he needs whatever be the names the others call them by; his materia medica is small and, though based on Ayurveda or Tibbi, is greatly dependent on family traditions, the amount of education received, and the flora of the country he practises in; to him the drug is but an instrument, it is the method and the brain behind it that count."

The modern conditions have raised two important points: (1) the supply of pure raw materials and (2) the training of capable vaids and hakeems.

The suggestions, whether written or oral, are many. Leaving details aside, they may be summarised as follows:—

What is wanted is a source of pure unadulterated raw materials. Ordinary people in bazaars should not be allowed to sell medicinal herbs, such sale being restricted to qualified herbalists. Their shops ought to be regularly visited by inspectors well versed in the knowledge of raw Indian drugs. There ought to be reference collections of indigenous drugs and,

if possible, gardens in the municipal areas in which to grow the medicinal herbs required by the local professionals in Indian medicine. Unani and Ayurveda schools or colleges ought to be opened in every Province and recognized by the Government. Only diplomated hakeems and vaids from those institutions should be allowed to practise after registration.

Dr. Ramjeedas Bajoria, Calcutta:—

"In my opinion a laboratory should be established under a Board of control composed of efficient Ayurvedic physicians for testing the raw materials sold in the market and used for preparing medicines, for, if the raw material is bad, the finished product is bound to be bad in quality; places where medicines are prepared should be inspected from time to time to see that the proper method is being followed; a minimum qualification should be laid down for persons to be employed in preparing them, and those who want to prepare and sell medicines and raw materials either as practitioners or for purposes of business should be required to take a licence from the Board. The licence should be subject to renewal at definite intervals of time and the Board should be authorized to refuse to renew or cancel a licence at their discretion if they think that the licence has been abused. The Ayurvedic schools should be required to give practical training in the manufacture of medicines also."

Hakeem Moulvi Muhammad Abdul Halim, Lucknow:—

"The present practice of each and every one being able to sell or manufacture the medicine should be stopped at once. Firstly, the Government ought to issue licences for all drugs and herbs just like intoxicating ones. Whoever may be found to sell medicines without being licensed and permitted by the proper authorities should be deemed punishable. Secondly, the Government may appoint an inspector (at least one in every district) who may be fully aware of storing of medicines according to the rules mentioned in our books and who may identify the superior quality from the inferior one. This inspector, at intervals, ought to inspect the stores and report to the authorities concerned, who may confiscate the licence or punish the guilty as the case may be. Thirdly, the Government should start a school for training of manufacturers and all the dealers of compound medicines should be ordered to engage only these trained attars in their laboratories. Fourthly, the licences, similar to those of the dealers of uncompounded medicines should be issued to the dealers of the compounded ones also and the same inspector should inspect the laboratories and report to the authorities accordingly. All persons should be prohibited by law to manufacture the medicines excepting those who have been granted licences. Presently the Government ought to adopt a liberal policy while granting licences in order to avoid discouragement. In order to meet the expenses I shall recommend the Government to levy a small tax on the dealers of medicine, both simple and compound.

"In order to raise the standard of medicines to the highest efficiency I shall urge the Government to start a botanical garden in which the herbs and drugs of supreme quality and nature may be cultivated and the seeds may be sold at rock-bottom prices to those desirous to help in this matter, by starting such private gardens. Thus when there will be abundance of supreme quality materials; the sale of inferior quality would decrease or diminish by itself."

Hakeem Sahib Dayal, Amritsar:—

"A Committee of Hakeems and Vaids should be appointed to compile a pharmacopœia of drugs used in indigenous systems. Only educated attars with over five years' experience should be permitted to sell drugs. New attars should be apprenticed to some attar's shop for a year. They should have a minimum qualification of having read up to VIII Standard. Inspectors of vaids should be appointed in cities with a population of 50,000; the appointment should be entrusted to local vaids, hakeems and attars. Pay should be at least Rs. 30 per mensem. He should be allowed private practice. He should hold the post for three years, not entitled to re-election. He should collect four samples, sealed, one given to the attar, second to Government Department, third to the local Medical Committee and the fourth should be opened in the presence of the Medical Board which should consist of ten hakeems and vaids. Two members who should be selected by lottery and president would test the sample.

"First three offences should be excused. For further offence the Committee shall notify the adulterated character of medicine. After fifth offence the druggists should be prosecuted.

"Every inspector should publish a list of reliable firms. Exhibition of indigenous drugs should be held in each Province and cities and sanads and medals awarded. Public should make complaints before the inspector who must make a note of them."

Ayurvedachariya Pandit Harinarain Chaturvedi, Principal, Government Ayurvedic School, Patna:—

"(*a*) All district municipalities should start a herbal garden in their own localities where pure indigenous drugs may be planted for identification and public sale, if there be any.

"(*b*) All local bodies should also appoint a well qualified vaidya to look after the sale of impure drugs in the market."

Vaidyabhushan Purushottamshastri Hirlekar, Amraoti:—

"A central body of learned Ayurvedic experts from all parts of India be appointed and power be given to them for supervision over original drugs (therapeutic agents), pharmacopœial medicines and proprietary remedies on the Indian market:—

(i) This body should give its decision as regards the purity and potency of the medicines;

(ii) chemists and medicine dealers should be ordered to keep open for the buyers the report of this body;

(iii) separate Provincial bodies be formed and they should supervise the medicines on the market from time to time and make a report to the Central body;

(iv) this body should publish once, or more times, a list of big pharmacies or manufacturing firms and dealers of medicines whose medicines are found faultless and usable;

(v) the dealers and pharmacies must possess a certificate from the body as to the faultlessness of the medicines they supply;

(vi) if possible, this body should publish a pamphlet giving the information as to the utility and usability with classes of distincton, if necessary, of the medicines allowed to be kept on the Indian market, so that the purchasers may have a correct idea about the medicines they buy; and

(vii) this body sohuld settle the standard formulæ of medicines to be allowed on the Indian market and supply these formulæ to the pharmacies and manufacturing chemists."

Dr. Abdul Ali, B.SC., M.B., B.S., Lucknow:—

"(*a*) Shops of indigenous drugs should be inspected frequently.

"(*b*) Number of shops keeping very costly drugs should be limited by issuing licences to reliable firms. This will facilitate more frequent inspection and will relieve them of unhealthy competition."

Pt. Surrendra Mohan, B.A., Principal, Dayanand Ayurvedic College, Lahore:—

"Being invited to express my point of view on the subject, I give some suggestions for the production of better and standardized Ayurvedic and Unani medicines.

"(1) Let the Government appoint expert Indian herbalists under the hilly Forest Department to collect ripe medicinal herbs in right season and preserve them properly.

"(2) Let the Government establish stores at suitable places in every Province for the sale of herbs, collected as in (1), so that the vaidyas, hakeems, pharmacists, grocers (*pansaris*) and even the western firms should purchase their quantities of indigenous materials from these stores for the preparation of their medicines.

"(3) Let research laboratories be established to investigate the properties of both the identified and obscure drugs, but expert vaids, acquainted with chemistry and therapeutics, should be engaged to work side by side with the chemists and doctors. Indian mountains are rich in herbs, which

are efficacious in many diseases, for which scientists know no cure or prepare organic or synthetical compounds of doubtful nature; but they are sent to the Indian market with great assurance through their advertizing agencies and, after a trial for a year or two, they prove a failure, as *insulin* for diabetes, etc., while the natural products of India dwindle away owing to our ignorance or indifference to them. The scientist of to-day has greater regard for the laboratory made articles than for fresh herbs of nature with vitamines and other healing forces. The Western methods of research are not sufficient to reveal the wonderful properties of the innumerable herbs of India. Let Ayurvedic shastras, dealing with thousand years old experiences of Indian sages and ancient scientists, serve as a guide for the investigators.

"(4) Drugs inspectors, well versed in Indian herbs and drugs, be appointed in every district to inspect, now and then, pansaris' shops to see it they are selling fresh and right drugs under proper names. They should be authorized to destroy rotten materials. This method will set right grocers to sell proper things.

"(5) Let a training school be opened in every Province, or it may be attached to the Ayurvedic and Unani institutions for pansaris, to acquaint them with right drugs and teach them in what way and how long each material be kept. They should also be instructed in simple pharmaceutical preparations, as syrups, confections, etc. The Government will have to maintain an experimental laboratory and a museum of Indian Materia Medica in such schools. The preparations of the school can be sold to public to make it a part of the expenditure. While admitting boys, preference be given to pansaris' sons and relatives.

"(6) Licence be given to the trained grocers to sell Indian herbs, drugs and poisons. Indian practitioners will spontaneously purchase their requirements from such grocers. Illiterate pansaris will no more be seen after ten or fifteen years. Prepared from better ingredients, indigenous medicines will be more effective and consequently more useful to the public.

"(7) Customs and Excise Regulations be revised to give greater facilities to the educated vaids and hakeems in procuring and keeping certain quantities of poisonous drugs than at present.

"(8) Let the vaids and hakeems, educated in regular and recognized institutions, be registered and given the right of issuing certificates of age, illness, death, etc., and be taken into Government, Municipal and District Board services. Their livelihood being secured by this, there will be seen less amorous advertisements in newspapers and on walls than at present.

"(9) There should be no bar on advertisements, as this is the best method of information to public of anything useful. Many patients, not cured by doctors and in hospitals, have been cured by the medicines advertised in papers. There has been no harm to public health by these medicines; if individuals and firms of western countries are allowed to sell their preparations in India through advertisement, why not Indian firms and individuals be allowed to benefit their brethern by their Indian medicines. The advertisers should however be warned to avoid illicit and amorous words and phrases in their notices, posters, pamphlets, etc., and legal action be taken, if necessary. In case of definite harm to the patients' health and on confirmation by analysis of the medicine, the matter should go to court for necessary action, against the advertisers, Indian, English, French or whosoever he may be.

"(10) If the Government desires that Indian people should have standard and reliable indigenous and allopathic medicines, let the Central and Provincial Governments establish big laboratories to prepare such drugs with Indian materials as far as possible. India is very vast in its resources and can supply the required quantities of medicines and drugs to its inhabitants, provided that the ruling nation is inclined to do so. The manufacture of medicine in India on large scale will greatly solve the problem of unemployment.

"(11) Provided the Government is ready to adopt all or some of the suggestions given above, a ruling body, named Board of India in Medicine, will be a necessity in every Province and shall consist of vaidyas, hakeems, doctors, and some laymen (lawyers, educationists) to govern all the affairs concerning indigenous systems (Ayurvedic and Unani). All the above suggestions have been given with a firm hope that the Drugs Committee will recommend them for adoption, partly or wholly, to the Government of India

to rejuvenate Ayurvedic and Unani systems for public benefit. On the other hand, if the Committee is bent on proposing legislation to the systems that are already labouring under great loss in comparison with the rival system, Allopathy, there will be no greater ill-luck for India and its people—to see their ancient sciences ruined, which they cherished for thousands of years; but the Almighty will help us to uplift them inospite of the heavy forces working against them. Every science will live on its inherent merits; I trust in the Almighty and the public for support."

II*

Bengal (8).

Indigenous drugs when prepared according to Ayurvedic directions will never be harmful (6). When properly purified according to Ayurvedic methods poisonous substances are deprived of their injurious effects. What is primarily wanted is a thorough knowledge of the subject.

Ayurveda Colleges for the training of kavirajs should be opened in every province and recognized by Government. Only doctors diplomated from those Colleges should be allowed to practise after registration (5).

It is suggested to have a Central Laboratory where Ayurvedic doctors and Western scientists would co-operate in the study of indigenous drugs (2). Research into the therapeutic value of indigenous drugs as now carried on by Western scientists should be continued (4).

There should be a separate Board of selected hakeems and vaids to control indigenous drugs and the Board should register practitioners and dealers. Only medicines approved by the Board should be allowed to be sold in the market. This Board should also compile a pharmacopœia from the standards that are already there and as new things come out they should be added.

It is very difficult to procure pure raw materials. There ought to be reference collections (2) and, wherever possible, medicinal plants ought to be grown under the supervision of experts (4).

Bihar and Orissa (4).

Indigenous drugs are not harmful if compounded according to the rules laid down in the standard works on Ayurveda and hakeem preparations (1).

Research into the value of indigenous drugs as therapeutical agents should not only be continued (3), but carried on a much larger scale (1); and Unani, (1). Kavirajs ought to be encouraged to do their own researches and Government should come forward with grants and other generous help (1). Let vaids and hakeems have their own way (1).

What is wanted is a source of pure unadulterated raw materials (3). Ordinary people in bazaars should not be allowed to sell medicinal herbs, only qualified herbalists (2). Their shops ought to be regularly visited by Inspectors with a knowledge of Indian medicinal plants (2). There ought to be reference collections of indigenous drugs (2), and, if possible, gardens in the municipal areas in which to grow raw materials required by the local vaids (1).

Tibbi and Ayurveda schools should be opened in every Province and recognized by Government. Only diplomated hakeems and vaids from those schools should be allowed to practise after registration (1).

The Central Provinces (2).

There ought to be a museum where standard specimens of indigenous drugs should be kept and the Curator would give advice to the people who require it.

Government should appoint a Committee of experts to pronounce upon the therapeutic value of indigenous drugs (2).

Bombay (2).

The idea of an Indian Pharmacopœia is that of a book in which there would be standards for medicines used by vaids and hakeems.

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* Summary of the oral evidence in some Provinces. Figures in brackets represent the number of witnesses.

Only men diplomated in Ayurved and Tibbi sciences who will use the preparations as indicated in their books should be allowed to practise as vaids or hakeems.

THE UNITED PROVINCES (6).

A central depot in charge of Government for selling pure herbs.

A central bureau in which standard samples should be collected in a sort of Museum and the people in charge of it should supply information to those who enquire about them.

Vaids and hakeems should be qualified registered men.

There should be collaboration of Eastern and Western experts.

THE PUNJAB (7).

Attars keep English drugs because the medicines used in the indigenous systems take longer time to prepare and in order to avoid delay they use the ready made Western medicines.

Pansaris and attars keep drugs which are very old and have lost all active properties. Inspectors are necessary (2).

Control of raw materials.

Vaids and Hakeems should be qualified registered men.

APPENDIX II

Patent and Proprietary medicines *

Rao Sahib Dr. U. Rama Rau, Madras:—

"They must be put a stop to with a high hand. There is no gainsaying the fact that quacks and secret medicines flourish even to-day in the civilized countries of England and America and are making headway against doctors and their prescriptions through widespread advertisements and fascinating phrases. The harm done to India by these patent medicines and secret remedies is incalculable. The value of patent medicines imported to India according to the trade report of 1926-27 was Rs. 27 lakhs, of which the United Kingdom supplied 15 lakhs, United States 3 lakhs and Germany 5 lakhs. How the Government of England neglected to put down this growing evil in their own country cannot be better described than in the words of Dr. Sidney Hiller, M.D., in his book on 'Popular Drugs.' He wrote:—'Many more instances might be presented but enough has been said to show how great is the credulity of the public regarding these remedies. At present no attempt has been made to cope with this traffic. No Government than ours neglects to interfere. France and Germany tolerate no quack remedies, while in the United States, although there exists a tax on proprietary articles, it is enacted that the composition of all drugs must be set forth on the labels. Our Colonies are vigorously attacking the problem. Our Government alone remains apathetic. Deriving a revenue of something like £300,000 a year from this traffic, nothing is done to regulate the trade or to abate its evils. It is certainly found that hospital and dispensary patients have squandered more money on quack remedies than they would have paid for medical advice and treatment. Short of prohibiting the sale of these preparations, it ought to be secured by an Act of Parliament that the composition of all patent medicines should be set forth on the label. In this way the public would know what they were buying and would be able to judge for themselves whether the extraordinary claims made for them had any basis in fact.'

"Thus the consensus of medical opinion in England is to prohibit by an Act of Parliament the sale of such patent medicines whose composition was not given on the label. Likewise, the Government of India, by an Act of legislature, must prohibit the importation of such patent medicines or their manufacture in India whose composition is unknown. The Taxation

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* Extracts from replies to the questionnaire other than those set out in Appendix C.

Enquiry Committee in their report to the Government of India have observed: 'Patent medicines are generally considered as suitable subject of taxation, partly for reasons of regulation, partly because they involve a form of luxury consumption, which is occasionally harmful, and are taxed among other countries in the United Kingdom, Canada, South Africa, Italy, France, the United States of America and Japan, though it is understood that in the last case the abolition of the tax is in contemplation. The tax is usually levied in the shape of a stamp duty and is collected with comparative ease since advertisement is an essential of trade. In England the charge of duty extends to all medicines in which any proprietary right is claimed, or which are advertised or held out without disclosure of the formula, as a cure for any ailment or disorder incidental to the human body. The adoption of a definition on these lines would meet one objection taken to the tax, namely, that it would interfere with the business of the vaids and hakeems. It will be clear that such interference would only arise in the case of advertised medicines, and not in that of prescriptions made up for private patients. A suitable rate for the tax would be four annas in the rupee. Its imposition should be accompanied by the application of a similar definition to imported patent medicines and an increase in the tariff rate on these to 50 per cent.' I do not consider that the imposition of the tax will go to solve the question of the havoc done to the health of the people by the secret remedies. The disclosures made by the British Medical Association so far back as 1912, in their book on 'Secret remedies, what they cost and what they contain' are appalling enough to convince any Government, who have the health of the people at heart, to take prompt legislative measures to eradicate this evil. Nothing short of prohibition of such patent medicines, indigenous or imported, which do not disclose the formula on the label will satisfy me as a medical man."

Dr. V. K. Parulkar, L.M.S., Bombay:—

"I believe that the sale of proprietary medicines with secret formulæ is increasing.

"Firstly, reading of advertisements of cures brought about by such preparations produces great effect on patients who have tried treatment of medical men without result. Such people come to the conclusion that doctor's treatment is useless and seek to find some other remedy for their complaints. When a person belonging to this class reads such advertisements he feels happy and thinks that it is possible to get rid of his disease. The assurance of cure and the force of arguments advanced to guarantee the same coupled with the certificates of the men cured, make such a powerful impression on his mind that he is easily duped. Specially, these advertisements make great effect on men who have got weak nerves as a result of self-abuse. They are ashamed to tell their secret to doctors and expect doctors to find out the cause. In some cases therefore doctors are not able to find out the cause, in the absence of the clear history which patient should give to medical men. Such patients therefore come to the conclusion that it is wise for them to try such remedies. Impotency in such cases is very common. Such men spend tremendous sums of money for getting virile again.

"Secondly, poor people who have not money enough to go to medical practitioners for treatment resort to out-door departments of hospitals, where, if they are not cured, some come to believe wrongly that they are not cured because proper attention is not paid to them, they being free patients.

"Thirdly, many patients suffering from venereal diseases avoid doctors out of shame and try proprietary remedies in the beginning but, when they get worse, consult doctors and remain under their treatment.

"The only way, I think, in which this practice of self-drugging by proprietary medicines can be controlled, is by not allowing drugs with secret formulæ to come to India and to put a stop to various quack remedies manufactured in India.

"It is the well-worded and attractive advertisements that give stimulus to the sale of such remedies. Therefore advertisements of proprietary medicines with secret formulæ should not be allowed to appear in newspapers. Manufacturers of proprietary medicines should be prosecuted for advertising such remedies without procuring in the first instance permission of the authorities that the Government may appoint."

Captain H. F. Maneckshaw (late I.M.S.), Amritsar:—

"Indian market is over-flooded with proprietary medicines, both foreign and Indian and both useful and useless. Many are harmful as well. It is partly the fault of medical men. They like to have a short cut to every cure and prescribe ready-made patent medicines, rarer the better, to impress upon their neurotic patients and they do not scratch their brains to write prescriptions of well-tried old drugs. I have seen patients going about from one chemist to the other in search of the patent medicine written by specialists and general practitioners. They had to go to Lahore to buy it, or they had to write to Bombay or Calcutta for it."

The Chief Medical Officer, B.B. & C.I. Railway Company, Bombay:—

"The present day doctor is more credulous than the gullible public. He will prescribe any patent medicine that is brought to his notice (the higher the price the better). The market is flooded with proprietary articles to such an extent that some doctors are forgetting how to write prescriptions. Unless an article has the *essential* ingredient and strength notified on the label, prohibit importation or tax 100—200 per cent ad valorem.

Mr. Manmatha Nath Chatterjee, Managing Director, the Whitehall Pharmacy Ltd., Calcutta:—

"Medical men, of late, have been prescribing patent medicines more than before, owing to increased propaganda work by the patent medicine makers and to the ineffectualness of the drug used by dispensing chemists, who have been compelled to stock drugs of inferior quality owing to constant price cutting.

"I have noticed that foreign patent medicines containing simple drugs are more effective than those up here, the formulæ being the same in both the cases. It is, no doubt, due to the chemically pure ingredients used by foreigners and the inferior commercial quality used here on account of poorness of fund and poor buyers."

Mr. A. J. Walmsby, Manager, The Planters' Stores and Agency Co., Ltd., Dibrugarh:—

"This will be difficult to remedy now as most imported proprietaries have some value, and the medical profession frequently prescribe proprietary medicines through fear of the drugs used in other prescriptions being inert or below strength."

Messrs. Smith, Stanistreet & Co., Ltd., Manufacturing Chemists, Calcutta:—

"We do not think that anything in the way of legislation will be of any use, but we do believe that a great deal will be done towards lessening their use by good pure drugs legislation. Many of the public use, and very many doctors prescribe, proprietary medicines in India because by that means they do ensure getting something which is of definite standard and strength, whereas if they use or prescribe pharmacopœial preparations they do not know what they will get with a very strong probability that it will be below strength, or inert, or possibly harmful. A stamp duty should be imposed on all secret proprietaries as is in vogue in England, but probably on a lower scale. The revenue from the sale of the stamps would go towards paying for the agents and laboratories required for enforcing the pure drug enactments."

The Civil Surgeon, Hazaribagh:—

"Proprietary remedies are very popular, especially when secret. Control would be so unpopular that it would not be effective."

Dr. T. H. S. Somervell, F.R.C.S., Tinnevelly:—

"As proprietary medicines are usually harmless, and as very little control applies in England, the value of such a scheme here is doubtful."

The Proprietor, New Medical Hall, Moulmein:—

"Allow it to go on, as long as revenue comes in. Water will find its own level. Good remedies will increase in sale and the bad will die out."

The Superintendent, Central Jail, Hazaribagh:—

"I think some are good. As regards control, this is a moot point. If the stuff is not good, people would discontinue its use. I see no point in exacting the formula of secret preparations. The dose of the drug is on the bottle."

The Edward Medical Hall, Multan, Cantonment:—

"*Proprietary Medicines with known formulæ.*—These should not be interfered with as they are cheaper and purer things. The doctors know well what they contain and the reputation of the maker is a guarantee that it is made up of good material. To this category belong Kepler's preparations, Merck's Mag. Perhydrol, Vigantol, Bayer's Neosalvarsan and Plasmoquin, Esanofelle, etc., etc. They are a great help for the doctor and the patient as they are a time saver for the both.

"*Patent Medicines with unknown formulæ.*—They are really a fraud and are very expensive too on account of the heavy cost of advertising them. Their sale is tremendous and they are a source of great income to the makers, and the retailers. Even grocers and pan-sellers sell them. Their import in India cannot be stopped as it is an international question. As they are advertised in the great papers of Europe, so the demand cannot be stopped. It should be left to the discretion of the public. Those who need and can afford to buy them, let them have it."

Messrs. Jagat Singh & Brothers, Chemists, Peshawar:—

"Sale of proprietary remedies forms the major portion of our business, and, on the enforcement of any Drug Act, may be the only business left for chemists. It is not interfered with in other countries and should be left alone here also."

The Civil Surgeon, Saugor:—

"The sale of such medicines will continue on the increase so long as they are of approved efficacy and no control will in my opinion check their sale."

Lt.-Col. N. S. Sodhi, I.M.S., Civil Surgeon, Lahore:—

"My opinion is that it would be hopeless to control the sale of proprietary medicines. I should leave them alone. Educational propaganda may help but I doubt if it would be of much use."

The Civil Surgeon, Allahabad:—

"The popularity of patent medicines is largely because of the very high prices current for dispensed medicines. Patients constantly ask for a patent medicine in preference to a prescription. A large part of this trade ought not to be interfered with. The more dishonest part is very difficult to handle and is rife in all countries. Prosecution for fraud might be used more often in gross cases."

Lt.-Col. A. W. Overbeck-Wright, I.M.S., Superintendent, Mental Hospital, Agra:—

"Proprietary remedies are in many instances of great benefit. Their formulæ however should invariably be registered at some central bureau and the sale of such remedies be declared illegal until so registered. Many of these are sold in ordinary shops and stores. The licensing of all shops dealing in such goods would enable some check to be kept on stocks and ensure old and deteriorated stock being weeded out."

Colonel B. Higham, I.M.S., Chemical Analyser to the Government of Bombay:—

"I think that no secret remedy should be permitted to be sold. All proprietary preparations should bear on their labels their percentage constitution and the names and address of the manufacturers in India or the importers, if of foreign origin. This would not be a complete safe-guard because it would always be possible for manufacturers to attach labels that did not correctly describe the contents and in many cases this action would defy detection. However, it would be a certain amount of use because, for instance, if a preparation was found to contain opium that claimed to be

free from that drug or vice versa an action should lie against the manufacturer or importer and the same would hold in the case of other drugs for which chemical tests are available. Naturally, in essence, the only remedy against the use of secret remedies is education. Apart from this, the only reasonable course is an effort to protect the public against harm as it is impossible by law to protect them against the swindle of buying useless drugs at exorbitant prices."

Dr. Chanda Lal Mathur, L.M.P., Retired Medical Practitioner, Muzaffarnagar:—

"The sale of proprietary remedies with secret formulæ should be altogether stopped. In case this is not practicable the sale of only such of them be allowed as satisfy some competent authority appointed by the Government. Names of such remedies may be announced in the Government Gazette from time to time."

Mr. R. L. Sethi, M.A., B.SC., Economic Botanist to the Government of the United Provinces, Cawnpore:—

"There is an increasing sale of proprietary medicines, and the reason is apparent. The general populace is poor and they cannot afford the doctor's fee. Partly for this and partly for the sake of secrecy they fall an easy prey to advertised medicines. An effective control should be brought over their sale, and the following forms are suggested:—

"(1) Proprietary drugs must be patented before being allowed to come to the market. They should not be allowed to be advertised unless they have passed a test of genuineness by a central controlling agency.

"(2) All patent medicines must have a formula on them.

"(3) It must bear the date of manufacture.

"This will stop a lot of quackery so rampant in the market at present."

Rao Sahib Dr. T. S. Tirumurti, B.A., M.B., C.M., D.T.M. & H., Professor, Medical College, Vizagapatam:—

"The country is being inundated with proprietary and patent medicines manufactured mostly by foreign firms.

"In my opinion the only way by which the credulity of the masses can be removed is by their better general education and by *propaganda against the use of patent medicines*, and by *exposure of the composition of secret remedies* by analysis, undertaken by a body of pharmacologists and chemists appointed by Government.

"To protect the masses from unscrupulous vendors and manufacturers of drugs, chemicals, etc., patents and trade-marks should be refused for secret remedies. Only those proprietary medicines, the composition of which is disclosed, should be recognized. The possibilities of modifying the Patents and Designs Act and Trademarks Act to achieve this object should be referred to a Special Committee, consisting of legal, medical, technical and business-men and Government officials."

Dr. Sanat K. Sen-Gupta, L.M.S., Proprietor, Sen & Co., the English Pharmacy, Bilaspur:—

"It is the Government's duty to protect the poor and simple public from the usually unscrupulous proprietors of useless and unwholesome nostrums. The makers ought to be made to disclose their formulæ to a Government Patent Medicine Board. The Board should judge that the prices charged and the curative virtues ascribed to it are reasonable and inspectors should pay surprise visits to their factories and analyse their stuffs to see whether the preparations are actually made as declared."

Major B. Sahai, I.M.S., Kohat district:—

"The pace at which proprietary remedies with secret formulæ are being placed on the Indian market is very alarming indeed. These are being advertised in such alluring and reassuring terms that persons suffering from diseases calling for urgent medical aid are being deceived into a false sense of safety by the million every day. In my opinion the sale of remedies with secret formulæ should be prohibited by legislation. Firms and individuals

who manufacture proprietary remedies should be made to divulge their formulæ to a Government department which should register the particular preparations and issue permits for the sale thereof."

The Assistant Director of Medical Service, Kohat district:—

"It will be observed that Major Sahai does not recommend what is believed to be the U.S.A. practice of compulsory detailing of formulæ on the label of proprietary drugs, but recommends their divulgence to a Government Department, who would issue permits if the formulæ were approved.

"It is considered that this would be the best way of getting on the track of any indigenous remedies which might repay investigation, and even enrich the pharmacopœia."

Dr. G. P. Das Gupta, Benares:—

"(*a*) They will be on the increase so long as there is no law to control the quacks or other practitioners in indigenous medicines. They ought to be brought to a certain standard of efficiency by legislation.

"(*b*) All such remedies must be registered after they have been chemically and in other ways examined. The certificate must be attached to the label. The exact formulæ will be considered secret and kept at the registration office. From time to time samples from the market should be examined to see that the formulæ submitted are adhered to."

Dr. Harihar Ganguly, Deputy Physician, Carmichæl Medical College, Calcutta:—

"Proprietary remedies, both imported and locally manufactured, are widely advertised and sold in India—most of them have secret formulæ. The ideal thing would be to prevent the sale of all of them having secret formulæ. In the case of imported preparations—no remedies are to be allowed to be imported into India unless they bear a label giving the composition of the preparation and a certificate from the State Board of Control of the country of manufacture. Even in such cases, the Indian Council or Board of Control should exercise its discretion as to whether it can be introduced in India. In the case of locally manufactured medicines—no preparation is to be allowed to come out in the market and be patented unless the composition of the preparation is declared and found to be harmless and efficacious."

Dr. A. C. Ukil, M.B., M.S.P.E. (Paris), Professor of Bacteriology, National Medical Institute, Calcutta:—

"*Proprietary medicines*, both imported and locally made, are widely advertised and sold in India. Most of them have secret formulæ and nobody knows if they contain harmless or harmful ingredients.

"Regarding their control, I am of opinion that

"(i) *in the case of imported preparations*—no medicines are to be allowed to be imported into India unless they have a label giving the composition of the preparation and a certificate from the State Board of Control of the country of manufacture. Even in such cases, the Indian Board of Control should exercise its discretion as to whether it can be introduced into India.

"(ii) *in the case of locally manufactured medicines*—no preparation is to be allowed to come out in the market and be patented unless the composition of the drug is declared and found to be harmless and efficacious. All proprietary medicines locally made should bear their formulæ on the label.

"Before any drugs or proprietary medicines are exported from India, the Customs Authorities ought to be empowered to see that they bear a label giving the composition of such preparations and that they are approved by the State Board of Control as conforming to the Indian standard."

Dr. S. C. Das, M.B., Lecturer in Pharmacology and Materia Medica, Robertson Medical School, Nagpur:—

"(i) No proprietary preparations with secret formulæ should be allowed to be imported or manufactured.

" (ii) Every proprietary drug or preparation must have on its label the names of at least the important constituents with their percentage which should include all the potent and specially poisonous ingredients.

" (iii) Names of diseases or disorders on labels of medicines for public sale should be strictly limited to those for which the article, in view of the recognized medicinal action of its ingredients, is considered, singly or in combination, a treatment. The manufacturer must assume responsibility for all therapeutic claims made for his product and must not make any false or misleading representation regarding his product or any false statement or incorrect or fraudulent design or device regarding the therapeutic effect, either in label, circular or any literature, not necessarily accompanying a bottle or packet.

" (iv) No manufacturer should be allowed to publish any testimonial from anybody attributing any therapeutic benefit from his product unless he himself assumes the responsibility for that and then too if censored and declared reasonable and justifiable by the central controlling board.

" (v) Advertising in newspapers or elsewhere should not exceed, in the impressions produced, the terms of the label."

The A.D.M.S., Madras district:—

" (*a*) My opinion is that such increasing sales are to a considerable extent detrimental, as they are based on the credulity of the Indian public rather than on the good results obtained.

" (*b*) (i) In my opinion control on similar lines as outlined in the Sale of Food and Drugs Act 1875, as amended by the S.F.D.A. of 1899 (England) should be exercised over them. (ii) It should be made impossible for the lay public to purchase proprietary remedies of a poisonous nature, especially hypnotics, without a prescription from a registered practitioner. (iii) The Medical profession in India should be debarred from issuing testimonials in favour of proprietary remedies."

Dr. Phani Bhusan Mukerji, B.SC., M.B., F.R.C.S., Lecturer in Radiology, Prince of Wales Medical College, Patna:—

" I view with alarm the increasing sale of proprietary medicines with secret formulæ in the Indian market. They are in most cases unnecessary and act as a drain on the national purse. I consider that if the manufacturers of these medicines, whether of India or abroad, do not agree to divulge the secret formulæ and mention them in the labels on the bottles, their sale should be stopped by legislative measures. In my opinion, the proposed legislation should provide that, in the case of proprietary remedies, whether imported from outside or manufactured locally, the labels on the bottles should show the composition of the contents inside, giving the proportions in which the ingredients have been mixed, and a certificate must accompany each bottle signed by the competent Health Authority of the country of origin of the remedy regarding the following facts:—

" (1) That the purity and potency of the ingredients used are guaranteed.

" (2) That the said remedy can be sold in the country where it has been prepared under the existing laws of that country.

" (3) That the remedy is really capable of producing those effects which are advertised for it.

" (4) The date of manufacture of the remedy.

" (5) The latest date up to which its potency and efficacy will last.

" The Customs Authority should have the same powers over these remedies as over pharmacopœial preparations."

Dr. J. Henderson, School of Tropical Medicine and Hygiene, Calcutta:—

" I am completely opposed to the use of secret remedies of any kind. Reputable medical journals, both Indian and foreign, should be approached with a view to preventing the use of their columns for the advertisement of such remedies. The use of the mails for the transmission of literature on, or samples of, such remedies should be made an offence if it is not already so."

The Inspector-General of Civil Hospitals, Assam:—

"Proprietary medicines, including those with secret formulæ, are used by a public all over the world. I do not see how this can be controlled, except by considerably enhancing the customs duties on all preparations which do not show their formulæ on the bottle."

The Civil Surgeon, Nowgong:—

"Control by law which permits sale only after such remedies have been analysed and certified to contain the ingredients which should be mentioned on their labels."

Dr. B. C. Oliver, M.D., C.M., Nagpur:—

"There should be an analysis of such publication of the formulæ in the medical journals and propaganda in the press against quack remedies. I do not see why there should not be a law passed, forcing the maker to submit his prescription to a Committee before he is allowed to make and sell."

Dr. Frank Noronha, M.B., C.M., D.P.M., Superintendent, Mental Hospital, Bangalore:—

"The sale of proprietary remedies is increasing by leaps and bounds and in my opinion the public consume them voraciously. The qualified medical man, however efficient he be, is ignored in the face of these proprietary stuffs. The advance of endocrinology and vitaminology has given an impetus to the growth of proprietary remedies. Many a patient expresses a preference to a costly patent medicine, over a well-thought-out prescription of certain efficiency and much cheaper in cost. They are either innocuous or are not what they pretend to be. In this country any one can sell them, even a hardware merchant is not precluded from doing so. There are local made and imported patent medicines.

"An official list of such preparations should be published by local Governments, and they should not be allowed to be sold except by licensed chemists.

"A heavy import duty on foreign proprietary remedies and an excise duty on local made ones will make them expensive luxuries and prevent people from fully indulging in them. I am aware that the amount of money that is spent on the so-called remedies is quite out of proportion to the benefits derived, which are mostly of a suggestive nature."

Dr. G. F. Rodrigues, M.D., Karachi:—

"There is an increasing demand for proprietary remedies amongst the public who wish to doctor themselves particularly.

"A special Council in Pharmacy and Chemistry should be established by Statute to report on all non-official remedies and nostrums on the lines of the U.S.A. Those who cannot substantiate their claims to competent authorities should be told to stop their sales and advertising of such nostrums. If not, the Postmaster-General and Railways should deny them postal and transit facilities."

Dr. C. P. Chaube, M.B., B.S., Delhi:—

"Some of these remedies are good, but the majority are of doubtful value. None of them has proved fatal by itself so far as I know.

"Their sale is confined to literate people in urban areas, who really ought to know better than doctors themselves on the strength of advertisements. The rural areas are not getting enough medicines, patents or defective. The indirect harm from patents is thus confined to wilful people who numerically do not form a considerable majority. Therefore, the sale of these medicines should be left alone to die a natural death as such men get their lesson. Any measures adopted to discourage their produce directly, will merely help the vigilants on either side to evade it till the misguided have had their fill."

Captain H. F. Maneckshaw, late I.M.S., Amritsar:—

"There should be a law that before proprietary preparations are advertised in India, the sanction of the Controlling Authorities should be taken. This authority should be Supreme Medical Council. The advertisements should only be allowed to appear in Medical and pharmaceutical

journals and not at all in lay papers. I lay stress on this point as I have noticed many of my European and Indian patients using these patent medicines without consulting any medical man and coming to grief. Further, without the permission of the Supreme Medical Council, no proprietary medicines should be allowed to be imported in India, both on economical and medical grounds. Money and health are both drained out of India. There should be total prohibition for sales of secret medicines."

Captain G. R. Parasuram, A.I.R.O., B.A., M.R.C.P.E., DIPL. PSYCH., Deputy Superintendent, Government Mental Hospital, Madras:—

"Most fantastic advertisements of drugs supposed to be of universal utility, supported by eminent public men without the least knowledge of the harmful effects of lending their names, should be subject to some sort of censorship. All advertisements regarding patent drugs should be allowed only after passing through the hands of a competent Board."

Dr. K. M. Hiranandani, C.M.S., L.C.P.S. (Bombay), L.A.H. (Dublin), Registered Medical Practitioner, Hyderabad, Sind:—

"There should be few Central Laboratories of Registration and others of Analysis, and some others of Research, museums, and still some more for experimentation. Every year reports should be published, and all the different proprietary remedies, and everything pertaining to it, with the names of manufacturers, organizers, dealers, places of import and export, should be mentioned, together with names of any medical practitioners, who have associated and their actual cost and selling price."

Mr. T. Ramachandra Rao, Wholesale Chemist and Manufacturers' Representative, Madras:—

"Some of the proprietory remedies are certainly very good. There is no objection to secret formulæ being allowed to exist, but control in regard to them may be exercised by registering them as patents. The ingredients used in the manufacture of the remedies should be given out to the office where the information will be treated as confidential, but the proportions of those ingredients or the process of manufacture may still continue to be secret."

Lt.-Col. J. A. S. Phillips, I.M.S., Director of Public Health, Bihar and Orissa, Patna:—

"The safest course would be to insist on the prescription appearing on the label. But even in Europe this has not been done and it is doubtful whether any attempt to do this in India would meet with success."

Captain P. De., B.SC., M.B., M.R.C.P., late I.M.S., Officiating Professor of Pharmacology, School of Tropical Medicine and Hygiene, Calcutta:—

"*Proprietary and patent medicines.*—The sale of proprietary and patent preparations is increasing by leaps and bounds. A glance at the trade returns of drugs and medicines (excluding chemicals and narcotics) in the sea-borne trade statistics of British India will convince anybody of the truth of the statement. This state of affairs has been created by incessant canvassing and advertisements rather than by the efficacy of the patent medicines placed on the market. By every mail one is flooded with an amount of literature explaining the virtues of these drugs to practitioners in such a way that one is tempted to try some of these preparations about whose purity and efficacy doubts might exist. Besides, a larger number of representatives of various manufacturing firms are going about in different parts of India explaining the virtues of these remedies to practitioners and this also adds in no small measure to the increase of sale of the patent preparations. Then there is the menace of patent medicines with secret formulæ. These are much more serious from the public health point of view than some of the well-known patents with the names of the ingredients written on the label of the container. Laws should be devised to deal with them with a strong hand. In America, no patent medicine is allowed in the market without the correct formula on the label. A crusade against these remedies is also being carried on by the American Medical Association by publications from time to time to bring the whole thing bare before the public. In England also, a publication entitled 'Secret Remedies' is issued by the British Medical Association with a view to warn the public against

the dangers of these patent medicines. In India something of this nature might be done for discouraging the patent medicines. Remedies with secret formulæ should at once be completely banned."

The South Indian Medical Union, Madras:—

"Regarding the proprietary medicines, we do not think, we need bother about exercising any control over them. The remedy is in the hands of the medical men; if they do not encourage, by prescribing any but those whose formulæ and composition are well known to them, the others with secret formulæ and composition are bound to go to the wall in course of time. The Government should ban all those medicines which pretend to be specifics; the label should only say that such and such a medicine is good for such and such a complaint."

Lt.-Col. L. Cook, I.M.S., Civil Surgeon, Bhagalpur:—

"With regard to Question 9 in the Questionnaire, you are treating with something which is not only necessary but which is practicable for legislative measures.

"The proprietary preparations and other allied rubbish that are poured into this country, and made in this country, are increasing year by year, and call for some action even if that action is only to protect the simple and ignorant populace.

"Not only should every proprietary preparation imported into this country have the necessary labels stating the ingredients contained therein, but on these medicines there should be a heavy import duty. This will benefit the country as a whole, not only by protecting the public, but by increasing the revenue. As a corollary it will increase the scope of firms in this country of placing their own 'panaceas' on the market. And this is where matters will be a little more complicated.

"If you limit such proprietary preparations as are manufactured in this country to only those that are advertised, you allow scope for evading the law, and the constitution of the law to cover every contingency will require careful deliberation. Even firms of the highest repute put on the market mixtures which may be 'panaceas' for Fever or Cholera and although the ingredients are printed on the labels, the law should be comprehensive enough to include such mixtures.

"By all means allow firms to put such preparations on the market, but enforce them to register such preparations, the registration fee being large enough to adequately increase the revenues of the Excise Department.

"One must admit that whatever the alleged virtues of such preparations, it is essentially a commercial proposition and, where a qualified practitioner is debarred from such a procedure, a firm of chemists who are generally wanting in knowledge of the clinical aspects of disease, are usurping and trespassing on the rights of the qualified medical practitioners. One must recognize that this is a country where the high and low, rich and poor demand 'Something in a bottle' for the treatment of every ailment; the cult of the Christian scientist, the plagiarism of the Cone System, or the practical advice of the qualified practitioner has no place in the practice of medicines in this country, unless accompanied by 'Something in a bottle', and the opportunities of the State for increasing its revenue from this idiosyncracy of the people is one that should not be missed."

The Managing Proprietor, Francis Medical Hall, Rangoon:—

"There is an enormous sale of proprietary remedies, with no control whatsoever and particularly in the hands of people who have not the least knowledge nor employ competent men to prepare same. The doses in most of the cases are imaginary and sold broadcast. Every precaution should be taken to see that only those people who employ qualified pharmacists need manufacture proprietary medicines and that every year the full range of the remedies should be sent in for chemical test as a protection against overdose, or indiscriminate use of drugs. Furthermore, every manufacturer should be made to register himself, his firm, marks and remedies manufactured and be prepared to get his products chemically examined.

Our intention being to be able to stop people who try to imitate well-known selling lines by indiscriminate use of drugs with no fear of consequences in the event of any mishap by keeping themselves aloof under a false name. with improper address."

APPENDIX I

Some samples of Advertisements of Patent and Proprietary medicines *

Cures snake bites on inhalation only.

Seed of strength. Renowned specific for functional debility in man.

Specific for dysmenorrhœa, painful menses, scanty or profuse, black, reddish or clotted. Cures sterility by regulating the menstrual function.

Corrects displacements, retroversions or bad positions of the fœtus.

Specific for chronic gonorrhœa and after effects (gout, blindness, etc.). Highly useful where silver nitrate injections have failed and done harm.

Specific for leprosy of all types, cures coppery spots, coloured spots, insensibility, deformations, mutilations, perforating ulcers, contraction of fingers, etc.

Better than insulin. Reduces sugar in two weeks.

Specific for all stages of pneumonia, bronchitis, pleuritis, cough and dyspnœa.

Specific for spyhilis and its after effects. It has cured cases where salvarsan or neo-salvarsan has failed or has done harm.

Infallible remedy for bleeding and blind piles or hœmorrhoids.

Specific for beri-beri and epidemic dropsy. Speedily cures swellings, palpitation, etc.

Most wonderful remedy for nervous debility, sexual weakness, loss of manhood, brain-fag, headache, neurasthenia, heart palpitation, low vitality, insomnia, etc.

Swift, sure and perfect cure of gonorrhœa without wash, syphilis without injection. Fistula, piles, sinus, etc., radically cured without operation.

Guaranteed sovereign remedy for syphilis ulcers, carbuncle, cancer, piles, etc.

Hydrocele and elephantiasis of any nature and standing, even hopeless cases, are efficiently cured without operation.

Unfailing in seminal weakness. A magical charm of immense potency in wet dreams. A special dose prolongs the period of pleasure.

To increase sex power. Stands unique. A dose or two invigorate and rejuvenate the weak and the impotent.

Pills which ensure peace and pleasure by removing your complaints about wet dreams, nervous irritation and indigestion.

Brings strength to the weak organ.

Real boon to suffering humanity. The most infallible specific for nervous debility, nervous weakness, dyspepsia, asthma, consumption, gonorrhœa, syphilis, venereals, menstrual and other diseases resulting from youthful indiscretions and loss of vitality. Unparalleled in imparting new life and energy, regaining radiant health and rejuvenating the system.

One pill taken two hours before supper restores manly power and vigour to the system. If taken for three days positively cures spermatorrhœa. If two bottles are taken continuously, complete restoration of manly power is assured.

It cleans the blood, purifies it and infuses strength-giving properties into it. To those who had left youth behind and feel its want, this tonic will bring back good health quickly, positively and permanently.

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* These have been taken at random and not with any intention to particularize or specially comment.

Assures a complete cure and fits women for conception within a year. Let no woman resign herself to fate and shut herself from the joys of motherhood.

Such is its potency that even cases given up as incurable by eminent practitioners have recovered under its use. It heals up all urethral sores and vitalizes them so that the patient is enabled to exercise wholesome intercourse with pleasure and joy after treatment.

It preserves the semen without loss, increases the quality and the quantity of the vital fluid. It is the only remedy in Ayurvedic system that can cure successfully impotency of any type.

Cures menstrual disorders of every kind, hysteria, rheumatism, sterility, etc., improves the general state of the blood. Most effective in bringing the reproductive functions of women into perfect order.

The best blood purifier. Perfect digestant. Cures constipation, gout, bloodlessness, spermatorrhœa, sexual weakness, venereal diseases.

Most effective and successful of all the medicines that have been discovered by the medical profession for the treatment of fever. Cures fevers of all kinds.

The most successful, the safest and the easiest remedy throughout the world for weakness, nervousness, lifelessness, listlessness and other allied diseases.

Produces and enriches the blood, thickens the semen, restores youth.

Saved from the grave. Cure for deranged nervous system.

Sure remedy for helping expectant ladies to give birth to male children only. Male offspring guaranteed.

Containing diamond and gold, keeps cheerful, improves digestion, increases appetite. Puts new life in all vital organs of the body. Very useful for weak and old persons.

White flow stops by its few days use and patient regains her health very hastily. By regular use of the medicine face becomes rosy and cheerful.

It is the approved and guaranteed treatment for all female complaints, irregular, painful or scanty menstruation, headache, giddiness, palpitation of heart, weakness and displacement of the womb.

Cures white leprosy and lucoderma radically. Rupees 500 if proved fallible.

Wonderful specific for all diseases. Regulates the nerves, bile and phlegm, increases vitality, mental and physical vigour and tones up the system.

Wonderful infallible medicine for syphilis, mercurial poisoning, gonorrhœa, urinary troubles and all sorts of blood impurities.

Powerful medicine for sexual debility, thinness of semen, impotency, night pollution and debility in general.

Great remedy for all female diseases as leucorrhœa, white, yellow or dark discharges, pain in the waist, back or womb, irregular monthly courses, sterility, etc.

Removes sexual debility, infuses new life and energy into the nerves and muscles, increases memory, refreshes brain and enriches and purifies the blood; rejuvenates the weak and old; impotency vanishes, perfect manhood takes its place.

Keeps one cheerful and active, strengthens the heart, improves the digestive functions, increases the appetite, invigorates the body and puts new life in the system. Hundreds of persons suffering from severe anæmia, nervous breakdown and other allied diseases, after failing to get relief from other remedies, were benefited by using it. If you want to preserve your youth, if you wish to regain your lost manhood, if you desire to attain sound health of body and mind, use it.

A reliable and speedy cure for all forms of malarial fevers, including the remittent and intermittent types, also for all cases accompanied with ague and for bilious fever and for complete reduction of enlarged spleen accruing in such cases.

Is a very efficacious remedy and quick in its action, giving immediate relief to the sufferings of asthma, bronchitis, croup and diphtheria. In asthma the relief is obtained on the first day of taking the medicine and the patient is able to have a comfortable night's rest and in a very short space of time the cure is effected.

A safe and reliable cure, quick and certain in its action. If the medicine is regularly administered both day and night, the distressing cough will be relieved in a few days and the cure effected in a week or twelve days.

Cures primary, secondary and tertiary syphilis, ulcerated sores, black pimples on the face, glandular swelling, scurvy sores, blood and skin diseases, and is a marvellous remedy, for impoverished blood, nervous debility, premature decay or want of strength and energy and the fearful complaints. And one who has used it will not deny the fact that it is the best blood purifier and a charm that infuses fresh vigour into the system. The mixture is pleasant to taste and is free from any injurious ingredient. It is perfectly harmless in its action and is equally efficacious to the healthy and the diseased.

The great remedy for all kinds of cough and asthma. There is no other disease so painful and intolerable as that of cough. Victims of these diseases never get peace of mind in any stage when at sleep or awake. When the diseases are severe the body is bedewed with sweat, the face becoming pale, expression impossible, the respiratory efforts become violent and the patient is in a paroxysm of the most intense dysphonia. When the patient is in such a stage he feels the world whirl round him; let him take one dose and he is sure to feel immense relief. It is the specific for the constitutional cure of cough and asthma. We generally advise our patients to use this medicine first of all. Three bottles are quite sufficient to destroy the disease to its very germ and to give great relief and peace of mind.

The wonderful invigorator of the nervous system. It is the best nervine tonic. It invigorates the brain, cheers the mind, removes all seminal weakness and acts as a sovereign remedy for sexual incapacity. It has the most exhilarating effect after use. It infuses a fresh vigour into the worn-out and infirm constitution.

Rheumatism banished for ever. At last there has been discovered a treatment which really does cure rheumatism, gout, lumbago, sciatica and uric acid ills. You must not delay a moment.

Thinning hair is often due to lack of natural oil which should be supplied from the roots. It supplies the oil, stimulates the growth and nourishes the hair.

Leave your old self in the background where it belongs, discard the 'nerves', the depression, the weariness, poor digestion, pain and weakness, and experience at once the marvellous exhilaration of health—one of the greatest boons mankind has ever known—the lightning pick-me-up, tonic restorative and vitamin energiser. Minutes and hours only separate you from that sparkling vitality and vigorous buoyant health which only it gives. You can benefit to-day because it acts rapidly and certainly. Many go so far as to say that it has saved their lives after years of suffering when nothing else has proved of benefit. New nerves for old, new spirits for old, new strength for old. Discard your poor nerve ridden aching painful "old self" for a vigorous body, alert brain, strong nerves, perfect nutrition and buoyant health.

Cure indigestion—Do not neglect your stomach. Keep a bottle always in the house. You will find it more useful than any other bottle on your medicine shelf.

Heals all cases of local blood infections, including boils, carbuncles, leg trouble, whitlows abscesses, poisoned fingers, poisoned wounds, poisoned bites. Thousands of families keep a box handy in the house for cuts, burns, scalds, biles, etc. It soothes and heals wonderfully and is perfectly safe for infants.

It is an effective antiseptic and germicide which immediately strikes at the cause of odors. It is a powerful deodorant, capable of overcoming even the scent of onion and fish. It is so safe it may be used in any body cavity, yet so powerful it kills even the stubborn B. Typhosus (typhoid)

and M. Aureus (pus) germs. We could not make this statement unless we were prepared to prove it to the entire satisfaction of the medical profession.

Eminent doctors all over the country are prescribing it, because they have put it to stringent tests and have found it act quickly and certainly in every case of diarrhœa, dysentery and other stomach and bowel complaints.

Specific for baldness, falling off of hair, etc.

Rheumatism, gout, sciatica, lumbago, chilblains, etc. Relief guaranteed or your money refunded immediately. Why suffer. Slip it in each sock or stocking beneath the heel, and forget them. They draw out naturally and quickly the uric acid from your system, giving instant relief.

Thin hair shouts age. The world looks upon thin and faded hair as signs of age. This is a serious handicap to all workers. Those labouring under it should use this. This time-tried preparation feeds the hair at its roots, supplies the nourishment that makes it grow thick and lustrous and fosters the development of the pigment to which it owes its natural colour. Thus there is no need to accept premature baldness or greyness as inevitable.

Sore throat? Quick ! Be on your guard for sore throat—the one thing that can often lead to serious ailments. Common forerunners of a nasty cold, 'flu or bronchitis. Don't wait for complications. Heed nature's distress signal and apply the right remedy in time. Nothing can heal so surely, so safely, so effectively, so quickly. It penetrates to the tissues and coakes out the inflammation at its very source. Ask your doctor.

Drink habit leads to ruined homes, starving children, poverty, misery, divorce, hard times, disease, broken hearts, death and what not? Conquered by it. The sure remedy for curing drink habit.

When a person feels so run-down that they are too tired to think, too tired to work, too tired to take exercise and cannot even sleep properly, it is this that will regenerate them. It gradually strengthens every nerve and muscle of the body and gradually makes a person feel more and more 'powerful.' It makes old people feel years younger and makes the young energetic.

Cures paternal and maternal weakness. It touches the spot.

Rejuvenate, penetrate and stimulate. These pills are powerful exciting pills, acting especially on weak nerves. They are absolutely safe and reliable. They almost instantly restore lost manhood. They renew lost 'power.' They are penetrating, rejuvenating and exhilarating. They can be taken in conjunction with the tonic-food specific.

This specific is unrivalled in the cure of Whooping Cough. Prescribed by medical men where ordinary medicines have failed.

Sufferers from 'Sugary' diabetes rapidly lose flesh, the skin becomes dry and harsh, the urine contains sugar. This specific has given satisfaction in many cases. Saccharine crystals should be used instead of sugar.

Gradually but surely, yet safely, removes superfluous fat. It also creates a healthy action of the liver and arrests degeneration of the kidneys. Sure and safe.

To increase sex power. Stands unique. This is a tonic and stimulant for those suffering from sex anæsthesia. A dose or two invigorates and rejuvenates the weak and the impotent. Our most stimulating and invigorating ointment.

Divine medicine for hernia. Cent per cent success without operation. Wonderful medicine for hydrocele, orchitis, elephantiasis and filaria.

Become young again. Sensational discovery by German scientist. It gives youthful freshness, energy and appearance once more, puts an end to sexual troubles, mental fatigue, nervous breakdown and neurasthenia in man and they can be retained for years in certain circumstances.

It makes younger in appearance, strength and energy; puts an end to sterility, irregular menstruation and all kinds of diseases peculiar to the fair sex. Removes superflous fat, headache, palpitation of heart. Can be safely and advantageously taken during pregnancy.

A wonderful medicine of the world (23 years old). Complete and permanent cure of gonorrhœa. Guaranteed in fifteen days.

Sure and harmless cure of cataract without knife. No matter what medicines have failed. Cure guaranteed.

A golden and miraculous remedy for lack of energy, loss of vigour, nervous heart, neurasthenia, low spirits, melancholia, frontal headache, loss of memory, lack of self-confidence, fears of self or others, inability to concentrate the mind, weak will power, mind wandering, premature age, impotence, insomnia, disagreeable or terrifying dreams, sense of personal failure, nervous sensitiveness, fickle fancies, lack of courage, inability to arrive at decision, confused thinking, halting speech, tendency to stumble, poor circulation, variable appetite, tired feeling on rising, desire to avoid the society of others, Sexual neurasthenia, wasting diseases.

Latest wonderful discovery for unyielding urinary diseases. Specific for gonorrhœa.

Guaranteed sovereign remedy for hernia, hydrocele, scrotal tumour, gout and rheumatism which proved radical recovery without operation.

An amazing elixir of life for young and old. The best and up-to-date nervine and sexual tonic. Restorative and blood purifier. Cures loss of manhood, sexual incapacity, seminal weakness. Guaranteed harmless remedy of highest reputation. Never fails. Energy in every dose. Removes tropical weakness, and lassitude and nerve troubles promptly. It is most suitable in the cure of all diseases arising out of abuses and excesses in life, after-effect of venereal and syphilitic poison, all obstinate skin troubles due to impure blood; anæmia, female disorders, consumption and convalescence, etc., etc.

It is wonderfully efficacious in tuberculosis of the lungs or any other part of the body even in cases where tuberculin injection, change of climate, sanatorium and every other treatment fail.

A single dose is effective. Complete relief in twenty-four hours. Radical cure in a week. It is the best cure for patients, both male and female of all ages and in all stages of the diseases. It is a radical cure also as it eradicates the germs of the disease, gonococci.

Diabetes cured at last. Amazing cure endorsed by thousands of eminent doctors.

Nerve sedative and tonic. It is a valuable tonic medicine. It gives tone to the nervous system and imparts vigour to constitutions which have been weakened by excesses and overwork. It improves the digestion, helps in the formation of pure, healthy blood and removes anæmic conditions and debility. It restores lost nervous vitality. It is highly beneficial in diabetes and other urinary disorders.

These tiny capsules—superior to copaiba, cubebs and injections—cure the same diseases as these drugs in forty-eight hours without inconvenience.

The indications are sexual weakness, hypochondria, premature ejaculation, eunuchoidism, general neurasthenia, inferiority complex, impotentia sexualis. Functional inadequacy is now known to be largely due to endocrine insufficiency—especially gonadal, adrenal, pituitary and thyroid insufficiency. The giving of vital glandular or endocrinal substances in proper qualitative and quantitative association is scientific therapy to restore glandular energy and normal physiologic balance.

Extension of life by this.

The joy of living, domestic felicity, renewed vigour, can be obtained by means of these gland preparations.

APPENDIX J

Summary of the oral evidence as a whole

MADRAS (57) *

With one exception the witnesses were of opinion that legislation to control the sale and manufacture of medicinal drugs in India is absolutely essential. The Controlling Board should be governed by some association formed under the auspices of the Government whose members should be

* The figures in parentheses represent the number of witnesses.

officials and non-officials recruited from all over India, and all of them Indian in the sense that they should have all their interests in this country The control might be purely Provincial (4) or Central with Provincial branches (17) and should extend to all medicinal preparations without any exception (9); some of the witnesses, however, would restrict it to Western medicines (3).

We have section 56 of the Merchandise Marks Act and sections 274 and 275 of the Indian Penal Code, but unfortunately they are not actually given effect to.

There should be a Central Laboratory for testing drugs (8) working in co-ordination with Provincial laboratories (5) or with the Customs Department. Inspectors should be appointed with powers to go and pick up any specimens they like for testing in the laboratories (2). Some of the witnesses (3) favour independent Provincial test houses.

While the greater number thought that an Indian Pharmacopœia is an urgent need (15) others would wait (2) and others would be satisfied with an Indian addendum to the British Pharmacopœia (5).

In the impossibility of banning secret remedies entirely from India (11), the publication of their composition on the label ought to be made obligatory (24) or the constituents should be made known to the Central Board. A very heavy duty may be put on proprietary preparations (11), though they will still sell (15) even if taxed from 20 to 30 per cent of their value; hence "no taxation" say some (6).

No advertisement of patent medicines should appear in lay papers (8) or at least advertisements which make extravagant claims for the drug, and the newspapers should be penalized for publishing such advertisements. Advertisements should be certified by a competent authority before being published.

Though Central control for drugs and Provincial control for foods would be good (2) a Pure Food and Drugs Act for the whole of India is better (3).

Biological products should be manufactured in India (4). The issue of vaccine lymph should be from Government institutions only (3).

Drugs should be handled only by qualified persons (4). Every importer and every manufacturer of drugs should be licensed (10) and should pay a testing fee for the examination of their drugs and preparations (2). A licence fee is to the interest of the manufacturers. They are allowed to manufacture; they are only paying for the privilege and helping to a very small extent in financing the Control Board, which ought to be financed to a great extent from licensing fees and import duties.

Put a stamp duty on all prepared drugs, a small duty of say, 3 pies per rupee, should not be felt and would be quite reasonable.

Encourage local manufacturers by buying their products, and do not subsidize any of these unless they really are in need of it.

All the reliable and reputed manufacturing firms to be put in class A and their products will be passed without scrutiny; the less known firms in class B and their products will be scrutinized (2).

Increased local manufacture will bring the price of medicines down. Every locally manufactured drug must bear a label showing that it has been passed by the Controlling Board (2).

Imported preparations should bear the date of manufacture. A list of firms approved by Government should be prepared; no firm whose name is not on the list should be allowed to come and sell their products in this country.

Says one "we should not impose very strict and stringent laws yet"; says another "if the control is lenient it will serve no purpose."

There are at present Customs laboratories at Calcutta, Bombay, Karachi, Rangoon and Madras with a control laboratory at Lahore.

When there is anything interesting from the Customs laboratory point of view, it is always communicated to the control laboratory. The control man, being in touch with all the laboratories, collects information from the several ports on the same and communicates his conclusions to all the laboratories for information and guidance. A similar procedure may be adopted in the case of a Central Pharmacological Institute and the Provincial Pharmacological Laboratories.

Q.—Supposing we give the Custom laboratories in different places some extra staff to test drugs biologically, do you think you could control the import of poor quality of drugs?

A.—I think so, provided we get adequate staff.

The United Provinces (62)

With two exceptions the witnesses thought that legislation to control the sale and manufacture of medicinal drugs in India is absolutely necessary. The control ought to be Central with Provincial ramifications (27), although some would prefer to have it Provincial (4). The Central Controlling Board to be a mixed body of official and non-official members, all Indians. The control to extend to all medicinal preparations without any exception (9).

There should be a Central Laboratory with Provincial branches to test the strength and purity of pharmacopœial and proprietary preparations and the composition of patent medicines (17). The Customs laboratories should be kept quite separate from the drug testing laboratories of the central organization; but there should be co-operation between routine and research. There should be a test house at the ports of entry, and every drug imported into India should be passed by a Medical Board appointed for the purpose.

All the drugs placed on the Indian market should be up to a specified standard fixed by the Central Board of Control (3). Chemists and stockholders should send their drugs for analysis (3), and inspectors should go round to pick specimens and send them to the laboratory to be tested (8). A fee should be paid for the testing.

Though the standards of the British Pharmacopœia with an Indian Addendum (3) might be adopted, the compilation of an Indian Pharmacopœia (24) is considered an urgent necessity (2) and ought to be undertaken immediately without waiting for the formation of a General Medical Council for India (7). It is admitted that some of the British Pharmacopœia standards and some of the ordinary methods of chemical examination have to be modified to suit the climatic conditions of this country (2).

In the impossibility of banning patent medicines from India as suggested by many (12), their composition should appear on the label of the container (36) or the formula should be submitted to some sort of Controlling Board who would see that the composition agrees with the formula submitted and would then pass the drug for issue (8). Advertisements laying extravagant claims should be stopped (14) and no patent medicine should be advertised unless a committee of experts has examined it and given a certificate (2). Though some advocate a stamp duty (3) or an extra duty (2) on patent medicines, others deprecate any kind of taxation on them because either some of them are good (5) or the tax will serve no purpose (3). It has even been advanced that any kind of control would serve as an advertisement and encourage the use of secret remedies. No one should be allowed to manufacture patent medicines without a licence.

Foods and drugs may be combined in one All-India Act (7); or they may be dealt with separately (12), drugs being subject to Central and foods to Provincial control.

Medicines should be handled only by registered qualified persons (4). All chemists should be compelled to store biological products in cold storage (8).

Biological products should be manufactured in India (3) and the labels should show the date of manufacture (3) and the lease of life (1). The manufacture of sera in India should be absolutely forbidden (3) unless we are satisfied that the standardization is in capable hands.

Local manufacture ought to be encouraged and protected and all manufacturers should have a licence. The licence to be issued by a Central Board who will satisfy themselves that the firm has got sufficient capital and trained men capable of preparing medicines or biological products (4). Encourage by subsidies or by buying from local manufacturers, or by removing the excise difficulties. Tax the importation of those drugs which could be manufactured in India, but only when you are satisfied that your checks in India are as effective as they are in America and Europe.

A small tax of 3 pies per rupee might be levied on all medicinal preparations without inconvenience to the public (5).

Excise duty on both the imported and locally manufactured drugs to be imposed rather than insist on a licence.

Any preparation which is not passed and registered should not be allowed to be advertised (2).

Research into the therapeutic value of indigenous drugs should not only be continued but extended.

Gardens for the cultivation of medicinal plants should be started.

Mr. R. L. Sethi, Economic Botanist to the Government of the United Provinces, Cawnpore, and Secretary, The United Provinces Drugs Enquiry Committee:—

"*Q.*—I see that you have given us a fair idea of what you understand by control. Could you dilate upon your scheme a bit?

A.—I am not a medical man as I have told you. I represent a body which is mostly concerned at present with the investigation of indigenous drug industry—how best we could explore the medicinal flora and cultivate them? The idea is two-fold; one, whether we are in a position to stop the outside export of tinctures and extracts and start manufacturing our own in India and, secondly, to supply pure material to the various vaids and hakeems. We are concerned with the United Provinces. We have had two meetings so far, and have taken evidence from certain vaids and hakeems. They told us that there is a great demand for these medicinal herbs and in the city of Benares alone there is a consumption of herbs to the extent of about Rs. 50,000 annually. They suggested that there should be a Central Depot in charge of the Government for selling such herbs. Regarding production of extracts and tinctures: it requires co-ordinated work of doctors, chemists and botanists. The medicinal flora should first be investigated to see how it changes in its active principles in different localities, to collect the crude material at the best time and to give it to the chemist to extract tinctures and lastly to the doctor to see whether it is useful in the light of the information obtained from available old literature. The Committee is chiefly concerned with investigation of medicinal herbs and plants and to find out the possibility of cultivating them on a commercial scale.

Q.—And you have arrived at a very similar conclusion to ours, and that is that a central bureau should be instituted in which standard samples should be collected in a sort of museum, and the people in charge of that should supply information to those who enquire about them?

A.—Yes, and the same samples will be supplied to various places where at present lot of mixture is supplied. There is such a great demand for pure herbs.

Q.—The Central Depot which you mention, is it to be something like a museum or a supplying depot?

A.—It will be a sort of a supplying depot; the collection is already maintained by the Forest Research Institute to Dehra Dun. That is not difficult; the difficulty is to cultivate the plant on a commercial scale and to supply to the people.

Q.—Unless there is an agreement, I am not prepared to say that you will get your plant identified by Dehra Dun?

A.—The Government of the United Provinces can engage a botanist for that purpose. The present constitution of the Committee consists of a doctor, a chemist and a botanist. The Committee is busy investigating various sides of the question. We have had only two meetings; the first a sort of preliminary meeting, and the second we held in Benares. The third time we are meeting on the 5th February in Lucknow and after that meeting the proposals may be formulated for submission to the Government. My personal proposal consists of having one or two farms of medicinal plants; one in the plains and the other in the hills. Then to identify the medicinal plants and to cultivate them on those farms to see how the active principle changes under different conditions. People consider some medicinal plants as useless, but we found the active principle of some more in one

season than in another. They can be given to the chemist and then to a doctor who can use them on patients and find out whether they are actually useful or not.

The indigenous system at present is under nobody's control. There is some control on the English medicines because they come from firms of some repute, but in the case of indigenous products—any man in the street manufactures and starts supplying. There is no control over them. This side also requires to be investigated. The indigenous drug industry should come under the control of the Government when the proposed depot for the sale of the herbs is started, the question of storing will also be looked into. Storing is a very useful art which also requires investigation. No work is easy, every work has its own difficulties. The general public is very poor and cannot afford to purchase medicines manufactured in Western countries. I have my own personal hobby of dabbling in this art. I prepare certain indigenous medicines and I just distribute to the poor. The western system is not within the reach of the poor, and they cannot do without the indigenous medicines. It is important that it should be subsidized or helped by the Government.

Q.—Is there anything which you would like to stress?

A.—The main thing is about the indigenous industry; the production of medicinal herbs, their storing and the study of their effect on the patients. For investigation into the various aspects of this question a Committee has been started in this Province. I am its Secretary. I think that is all I have to say."

The Punjab (70)

Legislation to control the sale and manufacture of medicinal drugs in India is absolutely necessary. The control ought to be Central with Provincial ramifications (33) and it should extend to all preparations without any exception (5). The control may be in the hands of Government (3), though some would prefer the Controlling Body to be absolutely independent as, for example, the General Medical Council. The Board should consist of official and non-official members with a non-official majority. If not exclusively Indians, the Board should have a majority of Indian Members.

There are Food Acts, but they are not at all effective. Foods and Drugs may be combined in an All-India Act (4), though it would be preferable to deal with them separately (13), drugs being subject to Central and foods to Provincial control.

There should be a Central Laboratory with Provincial branches (13) at least at the ports of entry (4), to test the strength and purity of pharmacopœial and proprietary preparations and the composition of patent medicines. The Customs should deal with the imported drugs which should be up to standard (2). There should be well-paid inspectors who should go and pick up medicines and send them to the laboratory for analysis (12).

Though the standards of the British Pharmacopœia with (8) or without (2) an Addendum might be adopted, the compilation of an Indian Pharmacopœia is considered an urgent necessity (26) and ought to be undertaken immediately (7) without waiting for the formation of a General Medical Council.

In the impossibility of banning patent medicines entirely from India (10), their composition should appear on the label (19), or a heavy tax should be put upon them (5), a tax high enough to make their use prohibitive. Advertisements laying extravagant claims should be prohibited (10) and all drugs which are in any way connected with sexual functions should not be allowed to appear in the lay press (2). Tax or no tax, secret remedies will still sell (2), you cannot stop them altogether and some of them are distinctly of value (2). A controlling board should have them analysed and then pass them, a mere formula on the label is not a sufficient guarantee (9).

Drug sellers should all be licensed. Only special chemists who have a good arrangement for proper storing should be allowed to sell biological products (9). The labels should bear the date of manufacture and the lease of life.

Local manufacture might be encouraged by bounties or subsidies, and all manufacturers should be licensed. As the local drug industry develops it may be protected by tariffs and higher duties may be put on all the goods imported (4). The excise duty on alcohol which is used for the preparation of medicines should be brought down, and all other excise difficulties removed (3). State managed model factories might be handed over to private persons when the experimental stage is over. The various agricultural units in the Provinces should be responsible for the production of medicinal herbs and plants (4).

It is admitted that a duty of 3 pies in the rupee may be levied on all medicinal preparations which are either imported or produced in India without inconvenience to the public.

Every Government should have a research laboratory where the research into the therapeutic value of indigenous drugs could be carried out.

Medical practitioners should all be qualified and registered.

The question of the capacity of bottles is a serious one.

Medical stores should destroy their old stocks and not be allowed to auction them for sale (2).

Legislation should be introduced gradually (2).

The North-West Frontier Province (10)

All the witnesses, barring one, were in favour of legislation to control the sale and manufacture of medicinal drugs. The control to be central with branches in the different Provinces (2). It should be a legal offence to expose for sale any drug which is not up to the standard.

The British Pharmacopœia with an Addendum should serve the purpose (2); but the immediate preparation of an Indian Pharmacopœia is desirable (5).

Secret remedies should not be allowed into India (2) unless they are heavily taxed (1) or their composition is shown on the label (2) or the formula has been submitted to a special Board and their permission has been obtained to put the drug on the market (2). Patent medicines should not be advertised beyond their possibilities (2).

There are many reasons why local supply is unsatisfactory; for one thing it usually leads to a certain amount of corruption.

Only qualified medical men should be allowed to practise (2).

Controlling labelling is most important.

Licence to sell biological products should only be given to chemists who have proved that they can store them properly.

The control of food to be Provincial, that of drugs Central.

Bengal (76)

Except for one solitary dissident, all the witnesses were of opinion that legislation to control the sale and manufacture of medicinal drugs in India is absolutely essential. Nothing short of Government control will be of any use was the general verdict, but 10 per cent of the witnesses favoured the formation of a Controlling Board with a majority of non-official members and a non-official President. The control ought to be Central with Provincial branches and should extend to all medicinal preparations whether imported or manufactured locally. In the case of imported drugs they should all conform to the British Pharmacopœia standards or be stopped at the Port of entry by the Customs.

There is a Food Adulteration Act. There are a Bengal Municipal and a Calcutta Municipal Act with provisions in them to deal with adulterated drugs, but in the absence of specified standards no action has so far been taken because there is not the essential machinery necessary to fix standards. In spite of suitable powers given, no prosecutions can be made for want of sufficient facilities for analysis, and, however, a few prosecutions would immediately raise the standards of strength and purity. Sanitary Inspectors are under the employment of District Boards, not under the employment of the Government, and the District Boards are loath to take any action.

There should be a Central Laboratory with Provincial ramifications to test the strength and purity of pharmacopœial and proprietary preparations, and the composition of patent medicines. This should be under 'popular' control, and all dealers and manufacturers should contribute towards its establishment and upkeep. The results should be published periodically in both medical and ordinary periodicals and this would result in the formation of a black list. Samples for analysis to be sent by visiting Inspectors specially appointed by the Medical Department. There should be a Test House at every Port of entry. It would be preferable if the Central Laboratory should restrict itself to the determination of standards and leave the routine analytical work to the Provincial branches. Routine and research should be kept apart. It should be made a rule that all manufacturers should send samples of their preparations for analysis and proper testing.

Though the standards of the British Pharmacopœia with an Indian Addendum (7) might be adopted, the compilation of an Indian Pharmacopœia (42) is considered an urgent necessity (37). It is admitted (5) that some of the official preparations of the British Pharmacopœia need being modified to suit Indian conditions. The Pharmacopœial Committee should consist of Indians—medical men and chemists (1).

In the impossibility of banning patent medicines entirely from India (2), the publication of their composition on the label ought to be made obligatory (31), or the composition might be registered by a Board of medical men (5) who need not make it public. A very heavy duty may be put on secret remedies imported into India and a stamp duty on those manufactured locally, though it is fairly probable that no amount of legislation will ever check them entirely.

Foods and Drugs may be combined in one Act (9); or they may be dealt with separately (17), Drugs being subject to Central and Foods to Provincial control. But a pharmacy Bill should precede the Food and Drugs Act or Pure Drugs Act (2) which ought to be managed by a Pharmaceutical Society (1).

Only those chemists who could store biological products properly should be licensed (12), though it may be hard on small dealers (3). Biological products could be manufactured in India (4).

All people handling drugs should be licensed (3). Unless we control kavirajs and hakeems all attempts on the part of Government will prove futile. In the Calcutta Municipal Act indigenous drugs are exempted; but control ought not to be restricted to allopathic medicines (4). The vendor of any medicinal drug of inferior quality should be prosecuted.

Local manufacture ought to be encouraged and protected and all manufacturers should have a licence (10). Manufacturing in the country on a large scale will bring down the cost price of medicines. Encourage local industries by bounties and grants; give them free alcohol, remove the excise difficulties, purchase their products for Government consumption in preference to foreign products, reduce the railway transport fares. Help indigenous industries in the shape of bounties or by protective tariff or by legislation. Let Government help by indenting from local firms of good reputation, bonded firms which maintain good chemists.

Excise regulations and inter-provincial duties are very irksome (4). The establishment charges of the Excise Department put on the bonders should be reduced. Small dealers who get spirit under the same concessions as bigger firms are not under the excise control and they are thus encouraged to issue understrength alcoholic preparations. Permission to manufacture tinctures should be granted to bonded manufacturers only. Duty-free alcohol for analytical purposes should be allowed to firms with bonded laboratories (3). Excise laboratories should be suppressed and only Customs laboratories kept.

Remove unfair competition on the part of the Government Medical Stores Depots (5).

It is generally more difficult to buy Indian raw products locally than to buy them from the European market. It is very difficult to get reliable raw materials in any quantity (7). There should be a central body to examine and analyse raw materials and grade them, say according to their alkaloidal content (3); this might also act as a Central Information Bureau where difficulties about raw materials might be referred to. The collection

of raw materials should be in the hands of experts appointed by those who deal in drugs (3). All people handling raw materials ought to be licensed (2). The 15 per cent duty on crude drugs should be suppressed, and export tax on crude drugs might be levied. Reference collections of raw materials would serve a very useful purpose (4), and the cultivation of medicinal plants might be undertaken under the supervision of men who know the business (2).

Regulations prohibiting the supply of duty-free preparations which are being imported, so that they should be produced locally, are required (6). Any tax will do, provided it does not raise the cost higher than it is now (3). It is considered that raising the price, say by one pice in the rupee, would not make much difference.

Government should make such arrangements as would make the production of quinine in the country possible (4).

Stocks might be kept in bonded warehouses and drawn, when needed, on payment of duty.

The list of exempted preparations containing dangerous drugs should be alike in the Customs and Excise schedules. Dealers selling poisonous drugs should be licensed.

Out-of-date preparations should not be bought at auctions and resold. The date of manufacture should be shown on the container.

Extravagant claims in advertisements should be put a stop to (12). There should be a Drugs Control Board or Licensing Board to whom the manufacturers should submit samples and their literature. No advertising should be allowed without a certificate from the Board. However, some of the witnesses believe that control over advertisements is impossible (2) and will not make the sales any the less. Let doctors stop prescribing patent medicines and the public will not buy them.

Cleanliness is very important. Inspectors should see that all places are kept clean and suitable for dispensing. Doctors should have control over the dispensing chemists' shops.

The Indian Merchandise Marks Act could effectively control the importation of adulterated and understrength drugs and chemicals, should the law be properly worked by the Customs Appraisers experienced in the drugs line. Health Officers under the Calcutta Municipal Act have powers for inspection of drugs and it is suggested that this should be extended to the whole of India.

There ought to be fixed standards of weights and measuring scales.

All drugs and chemicals should be given a definite tariff value in the Indian Customs Tariff, so that if the invoice value varied much from the tariff value the article would immediately be suspect. It should then be examined and if found adulterated or of inferior quality it should be refused admission into the country or destroyed.

There might be formed some sort of drug association in which some of the big dealers in drugs should join and see that impure drugs are not sold in the market. They should have a laboratory where small dealers could get their articles analysed. It is feared that control by the executive might be very hard.

Legislative control should not be very tight at the beginning so as not to stifle local industry. It might be started as an experiment in a Province and then, if successful, slowly and progressively extended to the whole of India.

There should be research institutes to standardize those local products which are prepared on allopathic lines. Research into the therapeutical, value of indigenous medicinal drugs should be continued (4).

The Central Provinces (12)

Legislation to control the sale and manufacture of medicinal drugs is absolutely necessary. The control ought to be Central with Provincial ramifications. The central controlling body to set the standards which will be dealt with by the provincial branches. The central body to consist mainly of experts, both official and non-official; though it is advisable to have a

strong non-official representation it is not necessary that there should be a non-official majority. The control should extend to all drugs, whether imported or manufactured locally.

There should be a Central Test House with dependent Provincial Test Houses.

Though there is no immediate reason for modifying the standards of the British Pharmacopœia (2), steps should be taken to compile an Indian Codex (4).

Patent medicines should be banned. If found impossible, the composition should be shown on the label (8) or the formula should be submitted to a council of medical men and if they realize that the medicine is reasonably valuable and that its composition is harmless they would permit it to be advertised to the general public (2). In spite of contrary opinions (1) advertisements should either be controlled (2) or totally forbidden in lay papers (1).

Local manufacture ought to be encouraged. Manufacturers should be given facilities to have their drugs examined and standardized at cheaper rates; and there ought to be a Central Bureau of information where they could submit their difficulties and problems. Medical Stores Depots should be abolished and Government should not manufacture. Facilities should be given for growing medicinal plants.

Biological products should be manufactured in India (2).

All dispensaries, even the so-called charitable dispensaries, should pay duty on alcohol.

No manufacturer should be allowed to publish testimonials from anybody unless censored by the Central Board.

The control of drugs ought to be Central, that of foods Provincial.

Poison licence should be granted only to chemists and druggists.

None but a registered medical man should be permitted to practise.

Do not interfere with Ayurvedic drugs for the present.

Bihar and Orissa (15)

Legislation to control the sale and manufacture of medicinal drugs in India is absolutely necessary. Nothing short of Government control will be of any use. The control ought to be Central with Provincial ramifications and ought to extend to all medicinal preparations, whether imported or manufactured locally.

There already exists a kind of legislation in Bihar and Orissa in the form of Municipal Acts which require that (1) shops for the sale of drugs which deal with Western remedies should be registered, and that (2) compounders should be qualified. In practice, however, the law remains non-operative. For example, according to by-laws there should be a fee for the grant of a licence and "no person shall compound, mix, prepare, or dispense or sell any drug in any shop or place registered under section 288 unless he holds a certificate of the form prescribed." Now the enforcement of the law rests entirely with the municipalities, and, as the municipalities demur from enforcing it, and as the Government has no power to see it enforced because it goes against the spirit of self-government, the law remains a dead letter. Moreover, the law is lame for section 284 says that "nothing contained in sections 282 and 283 shall be construed to apply to the sale of drugs used by practitioners of indigenous medicines." Again, a drug to be considered pure "must be of the nature, quality, and substance demanded by the purchaser", but there are no standards of nature, quality, and substance.

There should be a Central Laboratory with Provincial ramifications to test (1) the strength and purity of pharmacopœial and proprietary preparations, and (2) the composition of patent medicines. The results to be published in pamphlet form or in a Pharmaceutical Gazete.

Insist on definite standards and cut down the secret remedies.

Though the standards of the British Pharmacopœia with an Indian Addendum (2) might be adopted, it would be preferable to have an Indian Pharmacopœia (10). Although the Indian Medical Council may be considered the right body to decide upon the choice of a Board entrusted with the compilation of the Indian Pharmacopœia (2), still, being given a sufficient number of specialists, an immediate start ought to be made (10) without waiting for the formation of a General Medical Council for India, for the time is ripe. It is generally admitted that some of the pharmacopœial preparations of the British Pharmacopœia need being modified to suit Indian people and the Indian climate.

In the impossibility of banning patent medicines entirely from India (1), the publication of their composition on the label ought to be made obligatory (10) and the formula might be registered to prevent imitation (1). A certificate from the Public Analyst of the country of manufacture and one from the officer-in-charge of the Testing in India might be made obligatory (1). No amount of extra taxation will bring down the enormous sale of patent medicines (1), though taxation may be favoured by some (1). Moreover, an import duty, as suggested, would still leave untouched the secret remedies manufactured in India.

If Foods and Drugs are to be controlled by the same analytical Board, they should be combined in one Act (1); if not, they should be dealt with separately, drugs being subject to Central and foods to Provincial control (1).

There should be a directory wherein the names of reliable firms should be entered for the guidance of retail and wholesale chemists (1).

Some of the original containers are labelled by the local wholesale suppliers, the label should show the name of the manufacturer (1).

It is suggested that only those chemists who could store biological products properly should be licensed (2), but the proposal is impracticable (1).

Legislation is bound to fail if we stop the source of supply from outside without making provision for an adequate output at home (1). So local manufacture ought to be encouraged (4) and protected. An export tax on raw material leaving the country (1) would be preferable to a tax on drugs imported which can be manufactured locally (2). We have enough raw material to satisfy the needs of the local manufacturers and those of the foreign manufacturers, so exportation need not be stopped or restricted (1). But the rules laid down by the Excise Department regarding morphia and opium and spirits are very irksome (2).

Obscene advertisements and those concerning drugs which are said to cure anything ought to be controlled (4). Why not have a Board of Censors as is done for Cinema Films (1)?

Test Houses ought to be distinct from research laboratories (1).

Control should not be restricted to Allopathic medicines only (1).

Bombay (65)

Legislation to control the sale and manufacture of medicinal drugs in India is absolutely necessary. The control ought to be Central with Provincial branches and in the hands of Government. No distinction need be made between imported and locally manufactured drugs.

There should be a Central Laboratory with Provincial branches to test the strength and purity of pharmacopœial and proprietary preparations, the laboratories now existing in different parts of India could be utilized. Samples for analysis to be sent by Inspectors specially appointed for the purpose (10). There should be a Test House at every Port of entry. The Merchandise Marks Act might be extended and made operative by giving the Customs power to examine all imported articles and checking wrongly written labels and refusing entrance to every article below standard (7). Locally manufactured articles to be dealt with by the Provincial Laboratories. It would be preferable if the Central Laboratory should restrict itself to the determination of standards and leave the routine analytical work to the Provincial Test Houses. Routine and research should be kept apart (6). It should be made a rule that all manufacturers should send samples of their preparations for analysis and proper testing and should obtain a certificate from the Analytical Department before issuing their products for sale and advertising them.

Though the standards of the British Pharmacopœia with an Indian Addendum (2) might be adopted, the compilation of an Indian Pharmacopœia (28) is considered an urgent necessity (26). It is admitted that some of the British Pharmacopœia standards need being adjusted to local conditions.

In the impossibility of banning patent medicines entirely from India (6), the publication of their composition on the label ought to be made obligatory (26) or, the formula should be submitted to some sort of Controlling Body who would have the product analysed to see that it agreed with the formula submitted and would then pass it for issue (14) the formula remaining secret. Except for a few which are accepted as household remedies (2) all patent medicines whether imported or locally manufactured should be taxed heavily (4) or a stamp duty should be put on them (3) of not less than two annas in the rupee. Patent drugs should be sold by licensed chemists only and their advertising should be controlled (16).

Foods and Drugs may be combined in one Act (6); or they may be dealt with separately (17), Drugs being subject to Central and Foods to Provincial Control. The sooner a Pure Drugs Act is prepared the better (4). Any infringement of it should be treated as a criminal, not a civil, offence (3).

Only preparations of British Pharmacopœia standard should be imported into India. Chemists should only import and sell standard preparations. It should be made obligatory that the importer's or manufacturer's name appears on the container, with the date of manufacture and the date of exportation to India (7).

No dealer should be allowed to sell drugs or to deal in chemicals unless he is a duly licensed person. The drugs should be sold in their original sealed package. A guarantee of cent per cent purity should be given on each individual package so as to permit of tests of sealed original packages and prohibition of import of the contents if not up to the standards. The seller must be willing to have the stuff tested at some Government Laboratory and if not up to the quality he should be penalized for it, and the penalties should be enforced. All the marks on the label should be distinct and not ambiguous.

Tax all medicinal drugs. The 15 per cent duty as it now exists and in addition to that the *ad valorem* duty. It is suggested to put a stamp duty of one anna in the rupee. It is, however, desirable that the tariff should not be excessive; it should not affect the prices unduly (2) and should be just sufficient to give protection to the infant local industry for a number of years (2).

Local manufacture ought to be encouraged and protected and all manufacturers should have a licence. Encourage local drug manufacture by bounties and give protection in the way of tariff; either a duty on all imported drugs which can be manufactured locally or reduction of the Customs duty on raw materials which cannot be obtained in India. Remove the Excise difficulties and the inter-provincial restrictions. Give manufacturers duty-free spirits; do not ask them to pay full duty on wastage of alcohol which occurs during transit and allow them to use recovered alcohol once again for the same preparation. Purchase their products in preference to foreign ones. Close the Medical Stores which come in the way of private manufacturers and let not Government be a manufacturing body (14). Reduce the transportation charges by railway; actually you can get things much cheaper from England than you can get them from a place in India (10). Help indigenous drugs industries in the shape of bounties, or by protective tariff, or by legislation. Let biological products be manufactured in India (4).

It is very difficult to get reliable raw materials in any quantity, as there is no regular organization, no regular supplying trade of raw materials, and no agency to test their quality, so that on the whole local manufacturers prefer to import them. Government should establish an agency in the country to standardize the raw materials available therein and then certify that a particular lot is of a particular quality so that it will be easy for the manufacturers to standardize their preparations.

The cultivation of medicinal plants under competent supervision should be undertaken; there should be a Drugs Culture Department and the Agricultural Department ought to take up the keeping of all drug farms.

If anyone is bent upon growing medicinal plants for the purpose of manufacturing drugs he ought to be given full facilities by Government in the shape of free land, etc. There ought to be a sort of museum where a collection of standard locally grown drugs should be kept and the officer-in-charge would advise the manufacturers of the special time of the year and the district in which a particular drug grows.

Articles manufactured in India should be allowed to be purchased at duty-free rates.

No bounty! A few firms should combine and show what they can do. All the dealers, the manufacturers, and the retailers should combine and form a society or a council which would have its own laboratory and the dealers themselves would control the quality of the drugs they are selling.

Registration of all manufacturers and before registration they must show that they have a laboratory and personnel with sufficient knowledge of manufacture. Technical experts should be trained if we want local manufacture.

There should be a standard committee with as many non-officials as you please provided they are competent to understand.

The Poisons Act should be revised.

Weights and measuring glasses should be inspected as per Government test.

Old stocks of medicines should not be sold by auction as have been done, so we are told, by the Medical Stores on more than one occasion.

Only registered medical men should be allowed to practise.

Research into the therapeutic value of indigenous drugs should not only be continued, but developed by opening more laboratories or strengthening those already in existence.

The application of the regulations should not be too stringent at first, said some of the witnesses. Others were of opinion that if you want to have an Act you ought to abide by it; there is no sense in not being strict from the very beginning.

The American Medical Association have established a Council of Pharmacy and Chemistry. All drugs and nostrums are subjected to scrutiny to substantiate their claims and, if they are not verified, then the Postmaster-General is informed and mail and transit facilities are denied to the culprits, after they have been proclaimed. The post office should have the powers by Statute to stop all bogus advertisements and transit of bogus drugs as they have now the powers of stopping seditious and indecent matter transmitted through the post. There should be some sort of control established as in America to protect the ignorant people who are not capable of taking care of themselves.

T. A. Stewart, Esq., Collector of Customs with M. Niogi, Esq., Officiating Chemical Examiner, Bombay Customs House:—

Q.—The most important question we have to ask you is whether the Customs can help us in controlling the quality of drugs that are imported?

A.—That presupposes the establishment of a standard for drugs. Assuming an Indian Pharmacopœia were drawn up and legislation were introduced which would forbid the importation of drugs not conforming to the Indian Pharmacopœia, the question is whether we could or could not undertake the necessary analysis. For myself, I would say that it is impossible. At the present moment, such tests as we are doing in our laboratory are about as much as we can do and any addition to it would not only mean the expansion of our laboratory, which is impossible, but it would also add to the number of complaints regarding the delay in getting goods through customs. There is another objection I would urge to the proposal. We would have no control over drugs produced in India, which would be essential. If I were constituted one authority, there would be another and I could quite easily contemplate some amount of disagreement between the two authorities. It might even happen that drugs that have been passed as correct by us, might be the subject of review by an internal controlling authority and it would be unfortunate, not only for myself and the other authority,

but it would be unfortunate for others also, if there was any attempt to enforce the Drugs Act. Personally, as an administrative officer, I should prefer very much that there was one authority and it is obvious that I cannot be that authority.

Q.—There is one other point about the tariff valuation: it has been suggested that if the invoice value is considerably lower than the tariff valuation, then the sample should be taken and tested and valued according to quality. Do you think that the tariff valuation scheme could be extended?

A.—The tariff valuation scheme is a simplification from our point of view. It runs for a year. Then we review the valuation in relation to the trend of prices throughout the 12 months and take into account any general tendency in trade. Each September or October there is a general meeting of our Appraisers from each Customs House that meets in Calcutta under the Chairmanship of the Director-General of Commercial Intelligence. They pool their ideas and, as a result of that, tariff valuations are fixed for the next year and these come into operation on the 1st January. That is obviously a simplifictaion from our point of view since instead of examining invoices we have our value already determined for us and it is only a matter of calculation. But we do record the invoice values for the purpose of determining the tariff valuation at the next Conference.

Q.—We thought that tariff valuation might be extended to control medicinal drugs and chemicals. The only other way is to have a separate department to control the purity of drugs. Then you have to let everything into the country and depend upon the taking of samples by this special department?

A.—One of the obvious pre-requisites for fixing a tariff valuation is that there should be a more or less uniform import. For example, take Ammonia Chloride; it usually comes in hundredweights or in multiples of it. You may get it in 2-ounce bottles; you may get it in much smaller bottles and you have a distinct price range for the various size bottles. I have not examined the question of drugs, but in chemicals I happen to be dealing with a matter at the present moment. In the case of Peppermint Oils you may have a variation of Rs. 11 per pound. Obviously you cannot fix one tariff to cover all this. Trade is not uniform at every port. As a general rule, we do find that according to the packing of the goods, there is a variation in price. I think it is an acceptable proposition that all oils conforming to one standard would conform more or less to one price, and, if we had any doubts that the invoice price was far below the tariff valuation or our ordinary knowledge of what the price of a commodity is, it would give rise to doubts as to whether this was the genuine article.

Q.—Do you think something could be done on that line?

A.—It is quite in line with what we are doing every day. In defence of the public, we are operating the Merchandise Marks Act.

Q.—Do you think that can be extended to drugs?

A.—That we would take as being a quality of an intelligent Appraising Officer. He should take notice of facts of that sort with a view to carrying the matter further.

Q.—In determining the tariff valuation, you invite the opinions of several other institutions also?

A.—They are circulated to all the Chambers of Commerce and their criticisms are invited. After tentative fixation of the valuation, the Director-General of Commercial Intelligence very often goes on tour and meets these bodies and discusses any point they may have to raise in connexion with the tariff valuation.

Q.—And, if it is satisfactory, their opinion is taken into account?

A.—I don't say their opinion is always taken because they very often want the duty as low as possible and we want it as high as possible; but I will say that any representation that they make receives very full consideration.

Q.—It has been brought to our notice that quinine was often imported as two grains and on examination in the Customs was found only as one grain. It appears that the Customs people altered the two grains into one grain and allowed them to pass?

A.—If it is a case that a certain drug or mixture was imported, on the label of which was the statement that this contains two grains and on examination we discover that it only contains one grain, the labelling of that substance as containing two grains while it actually contains one grain, constitutes an offence under the Merchandise Marks Act. The power that is vested in us is to confiscate the goods, but if we think that the man himself is not at fault we might waive our right of confiscation or impose merely a nominal penalty on condition that he corrects the mis-statement on the label. It is very seldom that we do confiscate because in so many cases the error is not that of the importer and, if he can remove that error so that there is no danger of the public being deceived in the matter, then we choose to exercise leniency.

Q.—Isn't it possible that the error on the part of the manufacturer may have been suggested by the dealer?

A.—That is quite so and, if we see any tendency on the part of any manufacturer, we do proceed to confiscate and to the imposition of penalties, but in an isolated case it is not necessary to call for severe measures provided we can correct the misapprehension.

Q.—The general complaint from the medical men is that quite a large proportion of drugs imported into the country as well as manufactured are of defective strength. Have you come across many instances where the goods have been below standard?

A.—We have no standards to judge by. If a thing comes in labelled B.P. we test a sample and if it does not conform to B.P. strength, then we insist on erasing the B.P. mark. I don't know that we are even justified in doing so.

Q.—It has been suggested that there should be the date of manufacture, but they have also suggested that there ought to be the date on which a drug reaches India?

A.—That is a matter for the importer and his manufacturer. I certainly cannot undertake to see that everything was dated: that means entirely unpacking all the cases. It is absolutely impossible. You can put the onus on the importer that before he distributes his goods, he must have them dated, but it is impossible for the Customs.

Q.—There is one other point; if regulations are laid down with regard to labelling, could you check that as you are checking goods through Customs?

A.—So long as it did not involve an analysis of every sample.

Q.—Since when has your laboratory been operating?

A.—It has been operating since 1929.

Q.—What is the nature of the work done there?

A.—There is very little that we don't do.

Q.—You don't take the help of the Government analyser?

A.—We did, two years ago; but we decided that it was better to have our own laboratory working under our own control and incidentally it is cheaper.

Q.—Supposing a central laboratory was started in each port, both for testing imported articles as well as those obtained by agents from the market?

A.—The suggestion has been made and I resisted for this reason that we found, when our work was being done by other laboratory, we could not get it done with the expedition that we desired. At present I can refer at once to my Chemical Examiner, which is not possible for me when any other officer is in charge of the laboratory.

Q.—Do they have a separate laboratory in London or have they a Central Laboratory?

A.—I believe, in London they have a Central Laboratory, but the difference is that they have an extraordinary simple tariff in the United Kingdom. There are very few articles liable to duty in the United Kingdom, while almost every article is liable to duty in British India.

Q.—You have no information as regards the United States of America?

A.—No.

APPENDIX K.

The Agency for inspection, etc.

Demi-official from the Chairman, Drugs Enquiry Committee, to the Medical, Public Health and Excise Departments of all the Local Governments, dated 27th February 1931.

In connexion with the proposal for the appointment of officers for carrying out control over drugs by inspection of shops, seizure of articles, collection of samples for analysis, institution of criminal prosecutions, etc., which the Committee may recommend for consideration, four suggestions have been made, namely, to appoint officers of (1) the Excise Department, (2) the Medical Department, (3) the Health Department, or (4) separate special officers, as such officers. I shall esteem it a great favour if you will let me have the benefit of your views on these suggestions and your opinion as to the best course which may be adopted with special reference to the feasibility of utilising the services of the officers of your department. I am afraid I have to request you for a very early reply as the period fixed for the submission of our report expires by the end of March.

Demi-official from Major-General W. V. COPPINGER, C.I.E., D.S.O., M.D., F.R.C.S.I., I.M.S., Surgeon-General, Bengal, to the Chairman, Drugs Enquiry Committee, dated the 3rd March 1931, No. 65.

This case is similar to that of the Poisons Act where inspection is mainly done by the Excise authorities but assisted by Government Medical Officers nominated by the District Magistrate or other local authority. I am inclined to think that in this case the principal duties of inspection should remain with the Excise Department aided if necessary by special inspectors with medical qualifications in the larger centres. In the districts, the Magistrate should have the power to depute selected Government Medical Officers to perform this duty when necessary.

I am not anxious that this duty should be thrown directly on the Medical Department as it is largely a police one and might upset the friendly relations which should subsist between the Medical Department and the body of private practitioners.

Demi-official from Lt.-Col. F. COOK, Officiating Inspector-General of Civil Hospitals, Bihar and Orissa, to the Chairman, Drugs Enquiry Committee, dated the 3rd March 1931, No. 2622.

Your demi-official letter No. 1682 of the 27th February 1931. I am of opinion that officers of the Excise Department should be appointed for carrying out control over drugs by inspection of shops, seizure of articles, etc., this cadre is specially adapted and has experience in this work.

The Medical Department can assist by their local knowledge, which knowledge would be imparted to the authorities concerned.

Such rules and orders to be communicated to the Medical Department in this work would be circularized as circumstances warrant and from experience gained in working the control.

Demi-official from Col. H. M. MACKENZIE, M.B., I.M.S., CH.B. (Edin.), D.P.H. (Cantab.), Inspector-General of Civil Hospitals, Punjab, to the Chairman, Drugs Enquiry Committee, dated the 2nd March 1931, No. 1912-G.

Your No. 1681, dated the 27th February 1931. In my opinion the officers of the Excise Department could best take on the procedures referred to by you.

Medical Officers of Health might also be given some powers.

If, after trial, it was found that the work could not be satisfactorily carried out by the abovementioned classes of officers, it would be necessary to appoint special officers for the work.

I do not think the officers of the Civil Medical Department could be utilized in this connexion, but they might be asked to report to one of the officers concerned cases in which they had reason to believe that drugs of a low standard were being sold.

Demi-official from Col. H. R. NUTT, M.D., F.R.C.S., I.M.S., Inspector-General of Civil Hospitals, United Provinces, to the Chairman, Drugs Enquiry Committee, dated the 3rd March 1931, No. 24-C.

Your No. 1683, dated the 27th February 1931. I think this would best be done by officers of the Excise and Medical Departments. But the medical officers selected for this work should mostly be specially trained in Pharmacology and drug assay, and devote their whole time to this special duty. I do not think the ordinary medical officer will have either the special training required, or the time for these duties in a large town.

In small towns they could however carry out some routine inspection work, etc.

Demi-official from the Surgeon-General with the Government of Bombay, to the Chairman, Drugs Enquiry Committee, No. 87(1)-24-B of 1931.

[*Reference.*—Your No. 1677, dated 27th February 1931.]

The general proposal to seize samples for analysis and institute prosecutions will require legislative enactment and could, I think, be best incorporated in a Food and Drugs Act. Such Acts would probably have to be Provincial, the Government of India making provision for its own case under the Sea Customs Act.

In such an Act various people might be declared by Rules made under the Act to be authorized 'Inspectors' for the purpose of the Act, and those in the case of the district might include the Collector, the Civil Surgeon, the District Medical Officer of Health, any Assistant Director of Public Health, etc.

I think it would be a mistake to create special officers for this purpose.

As regards initiation of prosecution, that should be for the police on information furnished by the analyst.

I would suggest that the Punjab Prevention of Adulteration Act might be consulted in this connexion.

Demi-official from Major-General C. A. SPRAWSON, C.I.E., M.D., F.R.C.S., V.H.S., I.M.S., Surgeon-General, Madras, to the Chairman, Drugs Enquiry Committee, dated the 3rd March 1931, No. R. 254-A.

I consider that the most suitable agency for the drug control that you suggest would be by members of the Health Department. Neither the Excise Department nor the Medical Department are suitable for such work. Doctors employed on hospital duty cannot be spared to go about collecting samples whereas the duties of Health Officers naturally take them about the towns and bring drug shops and similar places more to their notice. I have not consulted the Director of Public Health in giving the opinion.

Letter from the Chief Medical Officer, Delhi Province, Delhi, to the Chairman, Drugs Enquiry Committee, Calcutta, dated the 19th/20th March 1931, No. 769/187.

I am of opinion that these duties should be carried out by the Excise Department on information supplied by the Medical and Health Departments.

Demi-official from Lt.-Col. BATRA, I.M.S., Officiating Inspector-General of Civil Hospitals, Assam, to the Chairman, Drugs Enquiry Committee, Calcutta, dated the 12th March 1931, No. 2074.

With reference to your letter No. 1680, dated the 27th February 1931, I write to inform you that I fully agree with the views expressed by the Director of Public Health in his letter No. 2198, dated 7th March 1931, to your address.

Demi-official from Lt.-Col. C. I. BRIERLEY, C.I.E., I.M.S., Chief Medical Officer and Inspector-General of Jails, North-West Frontier Province, Peshawar/Nathiagali, to the Chairman, Drugs Enquiry Committee, Calcutta, dated the 10th March 1931, No. 3997-S.

As far as the North-West Frontier Province is concerned, I consider that the control over drugs by inspection of shops, seizure of articles, collection of samples for analysis and institution of criminal prosecutions, etc., should be carried out by the Health Department of the Province. I would however add that the work should be entrusted to an officer of commissioned status.

Demi-official from Lt.-Col. C. A. GILL, D.P.H., I.M.S., Director of Public Health, Punjab, Lahore, to the Chairman, Drugs Enquiry Committee, dated the 21st February 1931.

In reference to your letter of the 13th of February, I think the best method of arranging for the collection of samples and drugs for analysis at the proposed central institution would be for the Drugs Act to contain a clause empowering the local Governments, who have adopted the Act, to nominate Inspectors for collecting samples for the purposes of analysis. We are appointing such Inspectors under our Pure Food Act and these Inspectors could readily collect samples of drugs as well as of foodstuffs. As at present arranged, the Inspectors under the Pure Food Act will be Medical Officers of Health and Sanitary Inspectors, but later on it may be necessary to appoint whole-time Inspectors.

Demi-official from the Director of Public Health, United Provinces, to the Chairman, Drugs Enquiry Committee, dated the 7th March 1931, No. 159.

[*Reference.*—Your demi-official letter No. 1691, dated the 27th February 1931, to Colonel Mearns who has proceeded on leave out of India.]

I am of opinion that officers of the Public Health Department should be entrusted with the duty of inspecting shops, seizing articles, collecting samples of drugs for analysis and instituting criminal proceedings. Under the United Provinces Prevention of Adulteration Act it is already one of the duties of the medical officers of health and sanitary inspectors in this Province to detect adulteration of drugs and bring offenders to book and they seem to be the only suitable agency that should be employed for the work your Committee have in view, particularly as officers of the Excise Department have no technical knowledge of medicinal drugs and officers of the Medical Department have no staff which could undertake regular inspections and go about the towns. The Public Health Department and its officers can provide both technical knowledge and staff in urban and rural areas. In the case of the more important drugs, such as quinine, etc., where a sanitary inspector's knowledge may be inadequate, the Medical Officer of Health himself can take samples. The proposed duties will moreover fit in with their normal duties under the Municipalities Act and the Food and Drugs Act.

Demi-official from Dr. A. DA GAMA, M.B., D.P.H., Director of Public Health, Bombay, to the Chairman, Drugs Enquiry Committee, dated the 5th March 1931, No. 47/B of 1931.

[*Reference.*—Your letter No. 1688, dated the 27th ultimo.]

I think that Public Health Laboratories under the Director of Public Health should deal with the analysis of drugs—

(1) As regards drugs like cocaine, etc., they may continue to be apprehended, for the present at least, by the Excise Department.

(2) For other drugs, special officers will have to be appointed under the Public Health Department which will, in future, utilize them also for the detection of adulteration of foods.

In the Bombay Presidency there are eight officers in the Public Health Department—five Assistant Directors of Public Health, two officers in charge of Public Health Laboratories and one in charge of Vaccine Institute. The number of Public Health Laboratories will have to be increased.

At present the major contribution of two-thirds in the case of Medical Officers of Health and half in the case of Sanitary Inspectors is paid by Government to the local bodies. My personal view is that, as in some of the other Presidencies, the cadre of Medical Officers of Health and Sanitary Inspectors should be provincialized, the minor contribution being recovered from the local bodies.

Demi-official from Lt.-Col. T. D. MURISON, D.P.H., I.M.S., Director of Public Health, Assam, to the Chairman, Drugs Enquiry Committee, dated the 7th March 1931, No. 2198.

In reply to your letter No. 1695, dated the 27th February 1931, I write to say that the only officers of this department whose services could be utilized for the purpose of inspections of drugs, shops, seizure of articles, collection of samples for analysis and institution of criminal prosecutions, etc., are the urban health officers. They are recruited from the sub-assistant surgeons class and then trained in the Bombay Sanitary Surveyors training class.

If this is approved by the Government of Assam, to whom reference will have to be made for orders, the services of the urban health officers may be utilized for this purpose.

The arrangement, I consider, would not be satisfactory.

Demi-official from Major C. M. GANAPATHI, M.B., D.P.H., I.M.S., Director of Public Health, Central Provinces, Nagpur, to the Chairman, Drugs Enquiry Committee, dated the 10th March 1931, No. Nil.

Excise Department.—I fail to see how this department which deals with seizure of drugs like opium, cocaine and illicit manufacture of liquor, can be in a position to know whether the drugs in common use are adulterated or not.

Medical Department.—Civil surgeons and medical practitioners of established repute who deal with drugs daily are certainly of great use if so employed but the difficulty is that they may not find the time to inspect shops, seize articles and collect samples for analysis. As for the institution of criminal proceedings, I am almost certain that they will not have the time to attend courts. Assistant medical officers or sub-assistant surgeons may also perhaps be employed.

Health Department.—These Provinces have three health officers, two publicity officers, one officer in charge of the Vaccine and Public Health Institute and several assistant medical officers or sub-assistant surgeons in charge of epidemic dispensaries. I consider that the health officers, if permitted by the local bodies who employ them, could be utilized for this purpose in their respective towns. With regard to the Public Health Institute, this institution is still in its infancy inasmuch as no separate building has as yet been constructed nor has the requisite staff been provided as yet. This work can only be undertaken usefully when the above conditions are fulfilled. As regards the assistant medical officers or sub-assistant surgeons, the obvious question which arises is whether in the absence of adequate training and experience they are competent enough to be employed to deal with such an important subject. All the same I believe by careful selection some of them at least may be so employed in addition to their ordinary duties. It would be just as well for me to point out to you that their ordinary duties involve considerable touring for tackling epidemics, etc.

Special Officers.—I am inclined to the view that officers with special training in this line or chemistry should be appointed for this purpose. By virtue of their special qualifications they would in my opinion command more confidence not only from the public but also from the shopkeepers who after all are the sheep led to the slaughter. Further, such officers would

not, generally speaking, harass the shopkeepers more than that which would result if these duties were entrusted to any other body of officers. This suggestion brings in its track the question of increased expenditure.

Demi-official from Dr. R. B. KHAMBATA, M.R.C.S., Bengal Public Health Department, Writers' Buildings, Calcutta, to the Chairman, Drugs Enquiry Committee, Calcutta, dated the 13th March 1931, No. 3453-G.

In reply to your letter No. 1690, dated the 27th February 1931, I am writing to say that the question of the agency to be employed for the inspection of druggists' shops, collection of dry samples and seizure of articles has been examined in the Bengal Public Health Department. While the employment of special Drug Inspectors might be the most efficient method, it would certainly be the most expensive. Under the Bengal Food Adulteration Act, 1919, qualified sanitary inspectors have already been collaterally appointed as food inspectors by the district boards and municipalities, under whom they are serving. Under the Calcutta Municipal Act, 1923, whole-time food inspectors are employed by the Calcutta Corporation. If the above sanitary inspectors and food inspectors could be suitably trained and limitedly authorized to inspect druggists' shops, collect and seize drug samples, they would form a ready and inexpensive agency for the purpose. Dispensary doctors could also be impressed for the same work within their own jurisdictions. The institution of prosecution proceedings should be done under the special orders of the district board or municipal chairman representing the local authority.

Letter from Major A. M. V. HESTERLOW, M.B.CH.B., B.SC., D.T.M. & H., I.M.S., Acting Director of Public Health, Madras, to the Chairman, Drugs Enquiry Committee, Calcutta, dated the 7th March 1931, R. No. 271-1 Sany.

I am of opinion that failing the appointment of a special staff for the purpose, the duties may be entrusted to the officers of the Excise Department.

Demi-official from Lt.-Col. G. JOLLY, C.I.E., I.M.S., Director of Public Health, Burma, to the Chairman, Drugs Enquiry Committee, Calcutta, dated the 6th/7th March 1931, No. 3871/6-s-4/27.

I think that the choice of officers must lie between the Excise Department and the Health Department. In places where the Health Department is well developed, such as in municipalities with an adequate health staff, I think the work should be left to them. In all other areas I consider it should come under the Excise Department, it being left to the Local Government to decide in each case which department should be responsible. In Burma there are only one or two towns in which the Health Department could undertake the work at present, but, as the Health Department develops, it could take over more and more.

Demi-official from H. E. HORSFIELD, Esq., I.C.S., Commissioner of Excise and Salt, Patna, to the Chairman, Drugs Enquiry Committee, dated the 28th February 1931, No. 11282/XXX-18 of 1930-31.

I have received your letter No. 1694 of the 27th instant. Unfortunately I know no more of the scope of your enquiry than I have learnt from the proceedings published in the Press from time to time. I understand that it is concerned with the sale of medicinal drugs and preparations, including many others besides those of a spirituous or narcotic character with which the Excise Department as such are concerned. What may be the nature of the inspection of shops selling medical drugs and preparations which you have in view I do not know.

There are two obvious objections to the employment of excise officers on such inspections—

(*a*) They will have no technical or scientific knowledge whatever of the substances sold;

(*b*) The present scale of supervising executive and clerical establishments is only sufficient for the discharge of certain particular duties under normal conditions. It has to be expanded to discharge those duties when conditions become abnormal and expansion would be necessary to discharge additional duties. This would involve additional financial charges. The additional volume of work would, in view of the volume of the trade in drugs and patent medicines, probably be considerable. There are other contemplated additions to the work of the department which have only been tentatively suggested so far, but may materialize in the future. I regret that I cannot answer your query about the best method of utilizing the services of Excise officers without knowing more precisely and in greater detail what you have in view.

Demi-official from Rai Sahib TARAKESWAR BHATTACHARYA, B.A., Commissioner of Excise and Salt, Bengal, to the Chairman, Drugs Enquiry Committee, dated the 5th March 1931, No. 497-E.

Your demi-official letter No. 16819, dated the 27th February 1931, about appointment of officers for control over drugs reached me on the 3rd instant on my return from tour. In my opinion, the officers to be appointed for the purpose should have sufficient knowledge of the contents of the drugs, their use and effect. The officers of the Excise Department will be very ill-suited for the purpose as most of them have very little knowledge of medicinal drugs. I am of opinion, if any officers of the existing departments of Government are to be empowered to have the proposed control over the drugs, they should be of the Medical and the Public Health Departments.

Demi-official from the Assistant Secretary to the Commissioner of Excise, Madras, to the Chairman, Drugs Enquiry Committee, dated the 4th March 1931, No. 530-Abk.

In reply to your letter quoted above, I am directed to say that if it is suggested that the Excise Department should undertake the supervision of druggists' shops, etc., with a view to prevent the use of impure or ineffective drugs the reply is that officers of this department have neither the time nor the training and knowledge required for the purpose. It would seem that the supervision must necessarily be entrusted to officers having the technical experience required.

Demi-official from J. N. L. SATHE, Esq., I.C.S., Excise Commissioner, United Provinces, Allahabad, to the Chairman, Drugs Enquiry Committee, dated the 10th March 1931, No. 12427.

I presume that your present inquiry relates to all medicinal drugs and not merely to drugs containing excisable articles. If so the new duties will involve supervision over medical halls and chemists' and druggists' shops in respect of all the medicinal drugs dealt in by them, for which officers of this department are not specially qualified. Your letter also does not make it clear how much actual work the proposals of your committee will involve in practice. If it is appreciable this department will be unable to undertake it without additional staff. The work really belongs to the sphere of the Medical or Health Department. I think therefore that it might with advantage be entrusted to officers of either of these departments. In any case, I cannot commit my department to undertake the work before I know precisely what the duties will involve in practice.

Demi-official from the Commissioner of Excise, Assam, to the Chairman, Drugs Enquiry Committee, Calcutta, dated the 16th March 1931, No. 5374-E.

I write in reply to your demi-official No. 1700, dated the 27th February 1931, to say that in my opinion inspection should in the ordinary course be carried out by the Medical and Public Health Departments (which, in this Province, are not entirely distinguishable, but that powers of inspection for the purpose of detecting and preventing offences against the Dangerous Drugs Act, the Excise Act, and the Opium and Opium-smoking Acts must also be reserved for the Excise Department.

Demi-official from G. P. BURTON, Esq., M.A., I.C.S., Excise Commissioner, Central Provinces, Nagpur, to the Chairman, Drugs Enquiry Committee, Calcutta, dated March 1931, No. Nil.

I have to acknowledge the receipt of your letter No. 1702, dated the 27th February 1931, regarding the agency to be employed for the control and inspection of drug shops.

In the absence of details regarding arrangements to be recommended by the Drugs Enquiry Committee it is difficult to appreciate how much work the agency employed will have to do. Of the officers mentioned in your letter I think that the executive staff of the Excise Department could most appropriately be employed for the purposes in view, inasmuch as these officers already have to keep an eye on the sales of various drugs and medicines containing excisable substances. Except in the largest towns, the supervision and inspection of druggists' shops should not involve a great deal of additional time and labour. Should the work in large towns involve the appointment of additional staff, your Committee will, no doubt, make recommendations regarding the authority which should be responsible for providing the necessary funds. I should add that the above represents my personal views on the subject, which I gather you desire, and should not, therefore, be taken as binding on the Local Government, who are not responsible for them.

Demi-official from the Excise Commissioner, Burma, to the Chairman, Drugs Enquiry Committee, dated the 16th March 1931, No. 494-2-E-56.

Reference—Your demi-official of the 27th February 1931. The only drugs with which the Excise Department is concerned are opium, ganja, cocaine and morphia. Control over the sale of these drugs is already exercised by this department and it is not understood in what way that control can be varied.

In regard to the sale of other drugs, the Health Departments of the various municipalities are concerned and not this department.

Demi-official from the Commissioner of Excise, Bombay, to the Chairman, Drugs Enquiry Committee, dated the 23rd March 1931.

On this important matter this department should have been consulted officially and given adequate time to inquire and make a considered reply. I am much handicapped in giving an opinion as I do not fully know the object or scope of the inquiry of your Committee. No officer of this department was examined by the Committee in Bombay.

Subject to these remarks, I give the following unofficial opinion, as far as shops for the sale of opium and intoxicating drugs are concerned.

The Excise Department deals with opium, intoxicating drugs, i.e., ganja, bhang, charas (the latter is at present allowed in Sind only), cocaine and morphia. Excise officers also can under the Poisons Act inspect shops selling poisons. The Excise Department is therefore the proper agency which should control intoxicating drugs being the sole agency which should control and inspect opium and intoxicating drugs shops. If this control were given over to or shared by another department or special officers, there would be friction. The duplication would also result in unnecessary wasteful addition to the cost, whether central or provincial, of administration, a matter especially to be deprecated in these days of retrenchment.

Further, if another department or other officers were given powers to inspect these shops, the licensees, owing to the inevitable increasing interference with their business, would not pay fee for their shops, much less vend, and this would seriously affect the provincial revenues.

Hence any regulations and measures which may be imposed regarding such shops should be exercised solely by and through the officers of the Excise Department.

I would further point out that increase of restrictions, regulations and inspections, etc., of such shops and sales are certain, unless very carefully considered, to result in converting the licit trade in drugs more and more

into an illicit one, which of course is subject to no regulations. There is a very large illicit opium trade in Bombay, due to the very high opium duty and other restrictions. There is an immense import and sale of charas, which is wholly illicit, as licit sale was abolished in 1922-23. The licit sale of charas is being reintroduced. There is much sale also of cocaine. Increase of restrictions on licit sale of ganja, opium and charas are bound to increase the illicit trade, and so defeat one of the presumed objects of your Committee. The imposition of too much restriction on, or increasing too much the price of, the comparatively harmless or less harmful indigenous intoxicating drugs will, I consider, merely result in the population taking to the deadly foreign intoxicating drugs, viz., heroin and cocaine. It will be impossible to prevent the extensive import and sale of these. There are now half a million drug addicts in Egypt out of a population of 14 millions. If you quote my opinion in your report, you might kindly state that it is demi-official.

APPENDIX L

Government Medical Stores Depots

(1)

Memorandum by the Assistant Director-General, Indian Medical Service (Stores)

The primary object of the formation of the Government Medical Stores Department was to ensure the supply of drugs, instruments, appliances, sundries, etc. (human and veterinary), of uniform quality and pattern for the Army in India and to this end Medical Stores Depots were maintained in four large centres in India, viz., Madras, Bombay, Calcutta and Lahore Cantonment, and one at Rangoon in Burma.

Originally these Depots were, as their name implies, stores pure and simple: they obtained drugs and medical and surgical equipment from Home or from the Indian market and issued them to military and semi-military charges.

Prior to 1894 these Depots were under the control of the local Surgeon-Generals but, after this time, were taken over by the Government of India and their control was vested in the Director-General, Indian Medical Service, and Army Department.

In course of time their sphere of activity was extended and by a normal process of evolution it was changed in character as the Civil Medical Departments of local Governments had turned to them as sources of supply as they found that they were paying very highly for importing stores and that, in the event of non-compliance or partial compliance with orders, their institutions were liable to be gravely embarrassed; they were also at the mercy of contractors at Home who were always glad to unload inferior preparations on clients in foreign countries.

This example in time was followed by many municipal and district bodies and Indian States. In addition to the extension of their areas of supply, the Depots gradually commenced the preparation of drugs and the manufacture of instruments and appliances. It is obvious that as India and neighbouring countries furnish a large proportion of the raw drugs required in the European market it must be cheaper to prepare the finished products, tinctures, extracts, etc., locally than to purchase them at home and ship them out again in a new form. The development of manufacture and preparation of surgical instruments, appliances and drugs has continued and the Medical Stores Department turns out preparations of guaranteed B.P. standard at prices with which the European market cannot compete. Factories for the preparation of drugs, etc., are located at the Medical Stores Depots at Bombay and Madras only.

In 1910 a conference of the officers-in-charge, Medical Stores Depots, or as they were then called "Medical Storekeepers to Government" was held in order to decide whether the Government of India was getting a fair return for money spent on Medical Stores Depots and whether, assuming that they were profitable institutions, their policy was defensible, in view of the extension to India of the activities of the trade.

It was proposed sometime before the outbreak of the Great War that stocks at Medical Store Depots should be reduced in order to save the interest on funds locked up in the form of medical stores. Fortunately this proposal had not materialized when the War broke out and therefore the Medical Stores Department was better able to cope with the situation which had to be faced. Shortly after the declaration of the Great War heavy demands pourned into Medical Store Depots in connexion with the forces despatched to various theatres of War, East Africa, Mesopotamia and Egypt; the Depots were also called upon to equip various new institutions, e.g., hospital ships, transports and ambulance trains. It soon became apparent that stocks in the Depots would not prove adequate to meet future demands and in February 1915 a large indent was submitted to the Director-General, India Store Department, London, to provide a reserve to replenish expenditure from field medical units.

Throughout the remainder of the year 1915 the work of supplying medical and veterinary stores to the Army in India, to overseas forces and to civil institutions in India proceeded smoothly and this was largely due to the increased output of the factories of the Madras and Bombay Medical Stores Depots.

At the end of 1915 extraordinarily heavy demands were received from Mesopotamia and extensive purchasing in India was adopted and it was then possible to meet all demands without delay.

In 1916 a base depot of medical stores was mobilized at Bombay for despatch to Basra to supply five divisions and was entirely equipped from the Medical Stores Department and staffed by three experienced Indian Medical Service officers as well as several assistant surgeons and clerks of the Medical Stores Department. This depot was improvised and despatched from Bombay to Basra with several hundred tons of stores within about a fortnight of the receipt of orders. This depot served in Mesopotamia as the sole source of supply of medical stores in that country until January 1917, the Medical Stores Depot, Bombay, being responsible for the replenishment of its stocks. It was relieved from that time by a British unit from England.

In February 1916 the stock of first field dressings having been depleted by large demands the manufacture of these was undertaken by the Medical Stores Depot, Madras, and between February and September of that year 90,000 were turned out. Up to the end of March 1920, a total of 316,000 of these dressings had been made at this Depot.

In February 1917 a further demand was made on the resources of the Medical Stores Department by the decision of the Government of India that all schools, colleges, laboratories and other scientific institutions which formerly submitted their indents to the Director-General, India Store Department, London, should in future obtain their supplies of such articles as were stocked at these Depots which were not obtainable in the local market.

During 1917 several ships conveying medical stores to India were sunk by enemy submarines and orders were issued by Government that the utmost efforts should be made to utilize local products as a result of which many drugs, instruments, appliances, etc., were obtained in India. At this time a considerable expansion took place in the outturn of depot factories both in regard to quantity and variety of articles manufactured and the department was still able to fulfil all demands. It was found at that time that the experiment of ordering instruments and appliances from Indian firms was not a success as they could not be depended on to supply articles of first-class material and workmanship. Messrs. Eyres & Co. of Bombay were able to turn out excellent work. In justice to the Indian firms it must be admitted that they had difficulty in obtaining steel and other materials of the proper quality. What they were able to supply, however, enabled the Medical Stores Department to overcome temporary difficulties which it would have been impossible to surmount without their aid.

In 1917 operations were undertaken against the Mahsuds in Waziristan and the supply of medical and veterinary stores fell to the Medical Stores Depot, Lahore. During this year also several garrison battalions arrived in India from England and 55 new battalions were raised in India for which medical and veterinary equipment had to be provided without delay. The number of hospital ships at this time plying to and from India was 19, providing accommodation for nearly 9,000 patients, and of these 8 had

originally been fitted up in India and all 19 replenished their stores from the Medical Stores Depot, Bombay. In 1918, 85¼ new battalions of infantry were created and these were provided with medical equipment without delay.

The following figures afford an index of the expansion of Indian troops during the War up to the date of the armistice in November 1918:—

	Pre-war strength.	Enlisted during the war.	Sent overseas.
Combatants including reservists ..	194,000	721,000	552,000
Non-combatants	45,000	427,000	391,000
Animals	..	..	175,000

On 6th May 1919, war suddenly broke out with Afghanistan and a base depot No. 1 was at once collected at Lahore but did not start work until 24th June, until which time the duty of dealing with all indents from the North-west Frontier and Baluchistan forces fell on the Medical Stores Depot, Lahore, and the force to be supplied amounted at one time to 340,000 men and 158,000 animals, while the mobilized medical units employed included 29 field ambulances, 12 casualty clearing stations, 53 staging sections, 15 sanitary sections, 8 advanced depots of Medical Stores, 1½ base depots, 10,000 beds in General Hospitals and 11 ambulance trains.

After 24th June stores were supplied in bulk by the Medical Store Depot, Lahore, to the Base Depot and distributed by it to mobilized units. At this time also, in addition to the existing peace and war veterinary units, 3 camel veterinary hospitals each for 500 camels, a camel convalescent depot and a horse convalescent depot each for 1,000 animals as well as additional field and mobile veterinary sections were formed in addition to two base depots of veterinary stores the equipment of which had been held in reserve at the Medical Stores Depot, Lahore, and which were mobilized and located at Quetta and Peshawar. These base depots supplied the mobilized units with Veterinary stores and replenished their stock from the Medical Stores Depot, Lahore. A statement showing the number of new field medical units, the equipment of which was provided and fitted up by the Medical Stores Depots at Bombay, Madras, Calcutta and Lahore Cantonment during the War is shown as an Appendix I.*

A statement showing the number of indents dealt with, the outturn of factories of the Medical Stores Department and the amount expended on the local purchase of stores by the Medical Stores Depots at Bombay, Madras, Calcutta and Lahore Cantonment during the years 1914—1920 year by year is shown as an Appendix II.*

Indents to the value of £436,244 were sent to the Director-General of Stores, India Office, London, from the Medical Stores Department, *in connexion with the War* between February 1915 and September 1919 and indents to the value of £762,086 to him from the Medical Stores Department between August 1914 and August 1920 for stores required to meet *ordinary requirements and for stock purposes.*

In addition to meeting military requirements, the Medical Stores Department continued throughout the War to supply the needs of the many hundreds of civil institutions, Government and non-Government medical and veterinary, which draw their supplies from Medical Stores Depots; it was at times necessary to restrict the issue to civil institutions of articles urgently needed for military purposes or of articles the export of which from the United Kingdom was prohibited but it is believed that no serious inconvenience was caused by such restrictions. *Many institutions which formerly made their own arrangements for medical supplies applied during the War for permission to deal with the Medical Stores Department and, in most instances, this was given.*

The above narrative does not by any means set forth the full extent of the activities of the Medical Stores Department during the War but is intended to show the important function fulfilled by it at that time both as a means of supply of medical stores to the Army as well as to the Civil Medical Departments.

In 1919 the Government of India deputed a Committee called the "Medical Services Committee" to inquire into, among other matters connected with the medical services, the question of the reorganization of the

* See page 409 infra.

Government Medical Stores Department. The findings of the Committee embodied several proposals for improvement in the department which they considered had been working under great difficulties.

Stores required by the Medical Stores Department are obtained—

(1) by importation through the India Office,

(2) from other Government departments, such as, the India Army Service Corps, Military Engineer Services, Director of Botanical Survey and Central Board of Revenue,

(3) by purchase from business firms and contractors in India,

(4) by manufacture and preparation at Medical Stores Depots.

The only Depots which possess factories are those at Bombay and Madras.

The present organization of the Department is that the Director-General, Indian Medical Service, is, in conjunction with the Director of Medical Services in India, responsible to the Government of India in the Army Department for the equipment and supply of all military medical stores and, with the Quartermaster-General in India, for military veterinary stores. In addition, he is responsible for the supply of medical stores to those Government and Government aided hospitals (both medical and veterinary) which obtain their stores from the Medical Stores Department on the civil side.

It should here be noted that since the question of medical supplies was made a " Provincial Transferred " subject civil institutions have the option of purchasing their supplies from the Medical Stores Department or from other sources as they desire but the Army is obliged to purchase its requirements from the Medical Stores Department. This applies to all classes of civil institutions and includes Railways.

Each of the Medical Stores Depots is under the supervision of an I.M.S. officer of experience assisted by one or more assistant surgeons and sub-assistant surgeons with a staff of office and store clerks, store assistants, compounders and a menial staff which includes packers.

At each of the manufacturing depots there is a highly qualified and experienced advisory chemist who tests and standardizes all preparations turned out in the factory which is under his direct control; he is assisted by highly trained assistants. The total present establishment of the Depots is as noted below:—

Madras	212
Bombay	180
Lahore	126
Calcutta	115
Rangoon	56

The policy of the Medical Stores Department is, as noted in paragraph 1 of this note, to supply drugs, etc., of uniform quality to those Government institutions, both military and civil, which submit indents and not in any way to enter into competition with private enterprise but rather to encourage it. It does not aim at making a substantial profit but only paying its way. In previous years it has been shown on occasions that, owing to various causes, the department has run at a loss. At the same time institutions which deal with it are assured of a supply of drugs of B.P. Standard and good quality as is also the case with instruments, appliances, etc. Every effort is made to obtain articles locally which can be shown to be of a standard equal to those imported as regards quality and price and indigenous materials are purchased locally for the preparation of drugs, etc., in the factories wherever practicable.

Imported stores are obtained through the agency of the Director-General India Store Department, London, to whom an indent known as the ' Home Indent ' is submitted twice yearly, the indents being known as the July and January Home Indents.

The former, based on a scheme and submitted by officers-in-charge of Depots, is scrutinized, checked, priced and consolidated in this office and sent to the Director-General, India Store Department, London, in September for stores required during the first eight months of the following financial year. The latter, after undergoing the same process, is sent in March for stores required

during the remaining four months of the financial year and is based on actual expenditure. During the year 1929-30 the total expenditure for all Depots on imported stores was Rs. 14,98,520 while that for stores purchased locally was Rs. 30,10,390. Local stores are obtained by calling for tenders, by advertisement to reach Depots by 15th December each year. Recommendations are submitted to the office of the Director-General, Indian Medical Service, together with the schedules of comparative statements of tenders on 15th February and orders are issued by him by 31st March after considering the recommendations. The schedules are then endorsed in Depots showing what items have been accepted and forwarded to the Controller of Military Accounts concerned.

Acceptance of tenders is communicated to tenderers and they are required to furnish security deposit in proportion to the value of their contract as set forth in the tender form. When local articles for which annual contracts have not been arranged are required, tenders are invited by officers-in-charge of Depots and, on their submission, the lowest rates offered are generally accepted, the contractors being bound to supply articles as per samples submitted. If the total amount of the purchase exceeds the financial powers of the officer-in-charge, sanction of the competent financial authority (i.e., Director-General, Indian Medical Service) is obtained before the purchase is made. Purchase of local articles can be made either by annual contract or otherwise by an officer-in-charge of the Depot up to the limit of his contractual powers, which is Rs. 1,000 for each item. Supply orders are placed with contractors from time to time for all stores required either on or out of contract. Those for spirits and other excisable articles are accompanied by a duty-free certificate.

When it is found that an article which has hitherto been prepared in the factories of the Depots can be obtained locally at a more reasonable rate the preparation of that item is closed down and it is purchased locally. The same applies to imported stores.

The following are a few of the stores which have previously been imported from Home but have now been placed on the local list as it has been found possible to obtain these locally at more favourable rates:—

(*a*) Paraffinum molle.
(*b*) Glycerine.
(*c*) India rubber gloves.
(*d*) Novarsenobillon.
(*e*) Ammonium carbonate.

The method of pricing stores obtained from Medical Stores Depots, both local and imported, has already been noted in this office No. 628/766 of 13/14th February 1931 to your address.

A priced vocabulary of medical stores is published and issued to all military and civil institutions who obtain their supplies from the depots but is not issued to the trade. Instructions for indenting officers are contained at the beginning showing the method of indenting, the charges for issues on repayment, etc., so that these officers may be cognizant of what they are paying for, supplies and extra charges. The rates of the priced vocabulary, which include 20 per cent for overhead charges but not packing and freight charges which are extra, are amended from time to time as prices fluctuate and are in accordance with the system of pricing noted above. The pricing of the priced vocabulary is carried out in the office of the Deputy Financial Adviser (Ordnance), Government of India, in consultation with the Director General, Indian Medical Service, and lists of amendments are issued by the former from time to time and are sent to officers-in-charge of Depots, Controllers of Military Accounts concerned and to indenting officers. The rates quoted in the priced vocabulary apply equally to all the Depots.

When stores are despatched by rail they are ordinarily sent by goods train and for military charges they are sent at special concession rate, but at consignor's risk, and a military credit note is used. For civil charges a civil credit note is used but stores are charged for at full freight rates. Statements have been made by certain persons in giving evidence before the Drugs Enquiry Committee that stores are sent by the Depots at reduced rates. This only applies to military charges and does not affect civil.

With each consignment of stores special instructions are issued in the form of a 'store forwarding memo,' so as to ensure that indenting officers may obtain their stores in good order. If complaints are submitted as to

loss by short weight, breakage, etc., each case is investigated by the officers-in-charge to whom it has been submitted and decided on its merits. If it is found that the complaint of the indenting officer is justified the loss is made up by the Depot concerned but every precaution should be taken by indenting officers on the receipt of stores to see that they are correct before they are taken over. Stores which are not required are permitted to be returned and credit is afforded for them. Similarly many forms of packing materials can be returned to the Depots and credit is afforded for them.

Complaints from time to time have been received from civil institutions that the prices charged for stores supplied to them by the Medical Stores Depots were relatively high in comparison with those supplied by private firms but this is at variance with the opinion expressed by many members of firms in giving evidence before the Drugs Enquiry Committee and in my opinion this only tends to substantiate the statement of the policy of Government that it is not the intention to compete with the prices obtaining in firms but to base the Medical Stores Department prices independently. In some cases our prices are higher and in others lower than those of firms but they are not elaborated with any idea of undercutting those prices or of competing with them in any way. Other charges which have been made against the Medical Stores Department are that sufficient stocks of many items are not available and consequently delay in receipt of these is experienced. In consequence of these complaints many articles which have hitherto been obtained by local Governments from the Medical Stores Depots have been obtained elsewhere. As a set-off to this the Inspector-General of Civil Hospitals, Punjab, asked in 1930 whether the Medical Store Depot, Lahore, could undertake the supply of stores to 394 Municipal Dispensaries and District Boards in the Punjab who wished to indent on it.

In 1928-29 the Surgeon-General with the Government of Madras tried the experiment of obtaining stores for six hospitals in Madras from a firm in England which had offered very generous terms for supply, but was obliged to acknowledge to the Secretary to Government, Local Self-Government, Madras, that there had been considerable delay in complying with indents and that the prices charged by the Company were, on the whole, greater than those which would have been charged by the Medical Stores Depot, Madras, and that the experiment had not resulted in any economy to Government.

In 1924 the Government of Madras had raised the question of the relatively high cost of stores from this Depot as compared with that of local firms and an inquiry was instituted by this office.

Price lists were obtained from two leading firms of wholesale chemists in Calcutta and Bombay and the relative price of their drugs taken for comparison with those of the same drugs at the Medical Stores Depot, Madras.

It was found that the wholesale prices for drugs from the former firm in Calcutta and from the latter in Bombay were actually 33 per cent and 55 per cent higher than the Medical Stores Depot prices even with a 10 per cent added.

In 1927 the Officer in charge, Medical Stores Depot, Madras, took up a similar question with the Surgeon-General, Madras, and in order to arrive at a definite result by comparison, had the drugs portion of an annual indent of the largest hospital in Madras priced from the catalogues of two wholesale firms of chemists in India and one of the largest wholesale drug manufacturers in Great Britain.

The results obtained were very striking and showed that the wholesale prices from the three firms were considerably higher than those of the Medical Stores Depot even with the addition of a 10 per cent profit for non-Government institutions.

One of the reasons why Government is able to turn out preparations at a less cost in many instances is that it has the advantage of low purchasing rates for bulk purchases of raw materials and a benefit results to both civil and military institutions from this; the present arrangement may be considered as a co-operative society between the Army and Civil Government from which both derive equally substantial benefits. If the Civil Government Departments decide to discontinue obtaining their supplies from the Medical Stores Department and obtain them locally the activity of the latter will have to be curtailed, stores, staff, budget, etc., reduced and, in the event of a crisis, such as, the late Great War, it will not be possible to reassume the

work of supply to them as supplies will only be made to the Army. I do not think it can be shown that there are enough firms in India which are capable of taking the place of the Medical Stores Department at present or of expansion to such a degree as to do so in anything like the near future and the result will be that the Civil Department will have to depend for its supply on probably two or three firms in India and in the event of prices being raised will have no alternative but to import stores. It should here be noted that the average daily outturn of stores from each of the four Medical Stores Depots in India is between 2½ *and* 3 *tons.*

From a perusal of the narrative of the work done by the Medical Stores Department during the War, in earlier pages of these notes, the inference to be drawn is obvious.

In conclusion I would point out that in spite of the fact that civil institutions are not compelled to obtain their stores from the Government Medical Stores Department the outturn of all depots shows a steady increase as is shown in Appendix III below.

Appendix I

Statement of new field medical units, the medical equipment of which was provided and fitted up by the Medical Stores Depots at Bombay, Madras, Calcutta and Lahore Cantonment, during the war.

Field ambulances	253	Sections.
Casualty clearing stations	93	„
Staging sections	116	„
Sanitary sections	31	„
General Hospital sections of 100 beds each	258	„
Advanced depots of medical stores	13	Depots.
Base depot of medical stores	1¼	„

Appendix II

Statement showing the expansion in the work of the depots at Bombay, Calcutta, Madras and Lahore Cantonment during the war.

Year.	Number of idents dealt with.	Outturn on factories in lb.	Amount expended on local purchase of stores.
			Rs.
1914–15	13,093	853,019	6,74,511
1915–16	15,481	1,786,961	10,67,106
1916–17	16,347	1,192,534	30,31,942
1917–18	18,052	1,030,646	37,92,563
1918–19	22,391	1,107,334	33,35,328
1919–20	19,690	1,322,541	30,19,829

Appendix III

Statement showing the increase in work done in Medical Stores Depots.

——	1913–14	1921–22	1929–30
1. Number of annual indents	3,020	3,598	4,062
2. Number of supplementary indents	10,287	17,627	12,477
3. Number of vouchers for stores issued	28,035	40,588	37,423
4. Number of vouchers for stores received	14,910	17,484	16,811
5. Number of packages issued	63,564	135,314	160,553
6. Weight of stores issued in tons	†	3,361	4,663

† Figures not available.

(2)

Letter No. 1406, dated the 26th January 1931, from the Secretary, Drugs Enquiry Committee, to the Assistant Director-General, Indian Medical Service (Stores).

I am directed to say that the points mentioned below have arisen for the consideration of the Committee in the course of the enquiry and that the Committee would be grateful if you would be good enough to let them have full information and the benefit of your views thereon. The points in question are:—

(1) Are deteriorated drugs and other materials ever auctioned by the Stores Depots;

(2) to what extent are the Stores Depots using Indian raw materials for the manufacture of medicinal preparations; and

(3) is there any unfair competition in regard to the price of drugs and other medicinal preparations and, if so, to what extent between private manufacturers and the Medical Stores Depots?

I am also to request you to forward to me at your earliest convenience a copy of the latest price list of drugs and other medicinal preparations, issued by the Medical Stores Depots, for the use of the Committee.

Letter from the Assistant Director-General, Indian Medical Service (Stores), to the Secretary, Drugs Enquiry Committee, Calcutta, dated the 13th/14th February 1931, No. 628/766.

With reference to your No. 1406, dated the 26th January 1931, I have the honour to reply as follows:—

(1) Enquiry has been made from Medical Stores Depots as to whether any drugs or preparations which have been condemned on account of deterioration have been sold by public auction or otherwise during the past five years and, with the exception of the Medical Stores Depot, Calcutta, all report that none have been disposed of in this way. The Depot reports that in September 1927, 492 lb. of chloroform which had been condemned as unfit for anæsthetic purposes was sold at a reduced rate to Messrs. Bengal Chemical & Pharmaceutical Works, Limited, Calcutta, for manufacturing purposes only under instructions from this office and that was the only occasion on which stores were disposed of in this way.

(3) There is no unfair competition in regard to the price of drugs and other medicinal preparations. The rates contained in the priced vocabulary of Medical Stores are fixed as follows:—

Local stores.—Actual purchase rate plus 20 per cent on account of departmental charges.

Manufactured stores.—(*a*) Actual cost of raw materials used plus (*b*) cost of labour plus (*c*) 20 per cent on (*a*) plus (*b*) on account of departmental charges.

Imported stores.—(*a*) Invoiced rate plus (*b*) 12½ per cent on account of freight and packing plus (*c*) 15 per cent on (*a*) plus (*b*) on account of customs duty plus (*d*) 20 per cent on (*a*) plus (*b*) plus (*c*) on account of departmental charges.

The allegation that the price fixed by the Stores Depot is not regulated by the actual cost price and that it is lowered with a view to gain an advantage over the prices fixed by the private manufacturers is not in any way based on fact. The pricing of stores is controlled by the Military Finance authorities in conjunction with this office.

A copy of priced vocabulary of Medical Stores, Section I Drugs and VIII Laboratory Equipment, duly corrected and up to date is forwarded herewith.

Letter from the Assistant Director-General, Indian Medical Service (Stores), to the Secretary, Drugs Enquiry Committee, Calcutta, dated the 9th March 1931, No. 628/1009.

With reference to your letter No. 1718, dated 28th February 1931, (in confirmation of letter No. 1406), I have the honour to forward herewith for

the use of the Committee two lists containing the information asked for therein—

List A showing the quantities of raw materials bought from Indian sources in 1929-30.

List B showing the quantities of raw materials imported from abroad in 1929-30.

List A

Statement showing quantities of raw materials bought from Indian sources.

Articles.	Quantity. LB.
Acid hydrochloric commercial	1,590
,, nitric ,,	1,285
,, sulphuric ,,	2,956
,, sulphuric B.P.	3,316
Asafoetida B.P.	411
Ajowan fructus B.P.	31
Anethi fructus B.P.	10,374
Aurantii cortex B.P.	2,146
Ammoniacum B.P.	54
Aloes B.P.	743
Artemesia brevifolia	11,298
Belae fructus B.P.	475
Belladonnae folia B.P.	3,320
,, radix B.P.	4,920
Benzoinum B.P.	745
Cardamomi semina B.P.	902
Carui fructus B.P.	133
Cinnamomi cortex	1,812
Cupri sulphas B P.	815
Coconut oil	3,284
Caryophyllum B.P.	3,093
Cassia pods B.P.	21
Croton seeds	200
Cannabis Indicae B.P.	55
Capsicum fructus	25
Catechu nigrum B.P.	365
Chirata B.P.	2,948
Cinchona rubrae cortex B.P.	761
Coriander fructus B.P.	134
Rosa gallicae B.P.	4
Ferri sulphas B.P.	5,969
Feniculi fructus	116
Gummi Indici B.P.	8,582
Honey	582
Kino B.P	95
Morphinae hydrochlor B.P.	36
Myrrhae B.P.	130
Mag. sulphas B.P.	372,449
Myristicae B.P.	179
Nucis vomicae semina	3,180
Oleum eucalypti B.P.	4,039
Oleum terebinthinae rectificatum B.P.	41,793
Oleum arachis B.P.	24,017
Opium B.P.	309
Pterocarpi lignum B.P.	115
Podophylli resinae B.P.	16
Piper nigrum B.P.	87
Quinine sulphas	5,937
Quinine acid hydrochlor B.P.	1,359
Quicklime	5,675
Rice	4,472
Resinae B.P.	2,640
Sapo durus B.P.	978
Sennae folia, B.P.	1,057
Sevum preparata, B.P.	5,073
Saccharum purificatum, B.P.	31,308
Strychnine Hydrochloride, B.P.	12
Silver	98
Scillae, B.P.	2,730
Spiritus rectificatus, B.P.	378,214
Tamarindus, B.P.	124
Turmeric, B.P.	25
Valeriana rhizoma, B.P.	160
Zingiberis, B.P.	4,906
Borax Purificatus, B.P.	904
Caffeina citras, B.P.	408
Calcii chloride crude	1,200
Calumba radix, B.P.	378
Camphora, B.P.	1,174
Do. (raw) fine white powder	1,831
Do. Oil	1,365
Cantharis (Blistering flies)	10
Cera flava, B.P.	98
Galla (Best blue, Basara)	236
Glucosum	4,649
Glue	50
Glycerinum, B.P.	35,435
Glycyrrhizae Radix, B P.	5,344
Linseed	200
Liquor Ammoniae fortis	4,091
Oleum citronella	2,356
Paraffinum durum, B.P.	28,179
Do. molle, B.P.	98,604
Plumbi oxidum pulvis, B.P.	1,155
Potassii carbonas, B.P.	15
Do. iodidum, B.P	7,997
Do. sulphas, B.P.	647
Pyrethrum powder (Lefroy's powder)	263
Salt	2,307
Scilla Exsiccata (Urginae, B.P.).	1,510
Soda caustic commercial	97
Sodii sulphas crude	20,077
Tin foil	5
Talc purified	300
Whitening	3,552
Wire iron fine	185
Zingiberis radix	4,906
Zinc cuttings	300
Acetone	234
Alumen sulphate ferric	42
Figs	2
Prunes	8
Oil kerosene	2,657
Golden syrup	41
Wool cotton	147,189

List B

Statement showing quantities of raw materials imported from abroad.

Articles.	Quantity.	Articles.	Quantity.
	LB.		LB.
Acidum hypophosphorous ..	6	Jaborandi folia	30
Do. Nitricum, U.S.P. ..	4,800	Jalpae radix	2,000
Do. Oleicum, B.P.	60	Lobelia	650
Do. Phosphoric concentrated.	600	Lister's double cyanide powder ..	90
Aconite Radix	250	Oleum Lavandulae B.P. ..	50
Aether Aceticus	40	,, Limonis B.P.	450
Antimonium sulphuratum ..	1	,, Myristicae	50
Arnica flores	6	,, Rosmarini B.P.	1
Arsenic iodide, B.P.	10	Pix carbonas preparata B.P. ..	30
Barium chloride	35	Potassii caustic commercial ..	2,200
Cantharidinum	1	Quillaiae cortax pulvis B.P. ..	25
Cascara Sagrada	3,000	Sarsae redix B.P.	530
Colchici cormus	210	Scammoniae resinae	125
Do. semina	10	Senega redix B.P.	1,200
Colocynthidis pulp	90	Stramonii folia	100
Digitalis folia	450	Strophanthi semina	40
Ergota	8,000	Strychnine	2
Gelsemi radix	25	Styrax preparata B.P.	450
Gentianae radix, B.P.	5,000	Sapo Animalis	10
Guaiaci resina, B.P.	15	Valeriana rhizome	170
Gum Sandarac	45	Virginian Prune bark	30
Hamamelidis folia	400	Viburnum	1,100
Hydrastis rhizoma, B.P. ..	40	Litmus blue	14
Hyoscyami folia	1,100		

APPENDIX M

List of crude drugs imported into India (prepared by the Committee)

Cacumina Sabinæ.
,, Scoparii.
* Colchicum Corm.
* Cortex Cascara Sagradæ.
* ,, Cascarillæ.
,, Coto.
* ,, Euonymini.
* ,, Hamamelidis.
,, Mezerei.
,, Pini Alb.
* ,, Pini Canadensis.
* ,, Pruni Virg.
,, Simarubæ.
* ,, Quillaiæ.
* ,, Viburni Prunifol.
* Coccus Cacti.
* Ergota.
Folio Arnicæ.
* ,, Buchu.
,, Cocæ.
,, Belladonnæ.
,, Damianæ.
* ,, Hamamelidis.
* ,, Hyoscyami.
* ,, Jaborandi.
,, Matico.
* ,, Uvæ Ursi.
* Flores Anthemedis.
* ,, Arnicæ.
* ,, Convallariæ.
* ,, Papaver Rhœdos.
* Herb Grindeliæ.
,, Lobeliæ.
Herb Monsoniæ.
,, Pulsatillæ.
* Lignum Guaiaci.
* ,, Hæmatoxylli.
* ,, Quassiæ.
,, Sassafras.
Radix Bryoniæ.
* ,, Aconiti Napelli.
,, Arnicæ.
,, Baptisiæ.
,, Cimicifugæ.
* ,, Gelsemini.
* ,, Gentianæ.
,, Inulæ.
* ,, Ipecacuanhæ.
* ,, Jalapæ.
* ,, Krameriæ.
,, Pareiræ.
* ,, Pyrethri.
* ,, Rhei.
,, Sumbul.
,, Sarsæ.
* ,, Senegæ.
* ,, Scillæ.
* ,, Serpentarii.
,, Stillingiæ.
* ,, Taraxaci.
,, Zedorri.
* ,, Rhizoma Hydrastis.
Semen Angelicæ.
* ,, Carui.
* ,, Colchici.
* ,, Strophanthi.
* ,, Anisi.

* Mentioned in British Pharmacopœia.

APPENDIX N

A Pharmacopœia for India

That the one great desire of the medical profession in India was to have a pharmacopœia of their own became apparent from the very first stage in the enquiry. The following circular letter was accordingly issued in the name of the Chairman:—

Dear Sir,

In connexion with the work of the Drugs Enquiry Committee now sitting, a very important point has arisen, viz., the standards of strength and purity to be adopted in the event of legislation following upon the report of the Committee. There would appear to be a choice of two methods:—

(1) *To compile an Indian Pharmacopœia.*—This book would include indigenous drugs in addition to drugs and preparations selected from the pharmacopœias of other countries, the standards of which could be modified, if necessary, according to the requirements and climatic condition of this country.

(2) To adopt as a standard, the British, United States or some other suitable pharmacopœia.

The Committee would be greatly obliged if you and your colleagues would send them a memorandum upon the advantages and disadvantages of these methods, with any suggestions you would like to put forward.

Your valued opinion upon this important point will be greatly appreciated by the Committee.

Yours sincerely,
(Signed) R. N. CHOPRA.

The answers are worth recording as they reflect the general feeling on the subject.*

(1)

Lt.-Col. J. D. Sandes, I.M.S., Professor of Medicine and Physician, Medical College, Calcutta:—

"It would be preferable, in my opinion, to adopt the British Pharmacopœia as the standard for India. I do not think the time is yet ripe for an Indian Pharmacopœia. Before the latter is possible, much further investigation and experimental work with indigenous drugs will be necessary. There might perhaps be an Indian Appendix to the British Pharmacopœia which would give a list of recognized and standardized drugs of Indian origin."

(2)

The Principal, The Prince of Wales Medical College, Patna:—

"I have consulted the staff here who are concerned and the suggestions received are in favour of an Indian Pharmacopœia. But so long as that work, which would certainly take time to compile, is not ready, the British Pharmacopœia should be used with necessary addenda. I believe the League of Nations (Medical) are endeavouring to standardize all drugs."

(3)

Major W. C. Spackman, F.R.C.S.E., I.M.S., Bombay:—

"*Indian Pharmacopœia.*—It would be desirable to base this on the British Pharmacopœia because this has been the basis of teaching pharmacology in the medical schools of India, and of foreign graduates the great majority possess British qualifications. There would be an advantage in incorporating preparations from the American and Continental codes where

* See also the summaries and extracts from answers in the other appendices.

they are not represented in the British Pharmacopœia and such indigenous drugs or preparations as are of proved value must clearly be added to give a distinctive character even if many of us will lack the necessary acquaintance with them to use them. The main difficulty would appear to be in selecting the list and fixing standards, but if a sufficiently representative and balanced committee got together it should be possible, especially as so much could be taken *en bloc* from available sources (the British Pharmacopœia, etc.)

"I see no alternative method to the above formation of an Indian Pharmacopœia if the legislation contemplated is to be pushed forward."

(4)

Sir Tamulji B. Nariman, *Kt.*, L.M. & S., F.C.P.S., M.R.C.P., Bombay:—

"I am in favour of adopting as a standard the British Pharmacopœia, with the addition of proved efficacious indigenous drugs. I have been in general and consulting practice since the last 58 years, having graduated in medicine in 1872; I used to prescribe indigenous drugs, but there was no standard and no uniformity in their preparations. If we have purely an Indian Pharmacopœia with the additions of drugs from other pharmacopœias, the difficulty will be enormous in case of medical practitioners already practising. It will require a new materia medica and the course of instructions in the medical colleges must be different from what it is now. This, I say, will cause considerable inconvenience and difficulty to thousands already practising, who have been for years familiar with the drugs of British Pharmacopœia.

"Taking as our standard the British Pharmacopœia, with the addition of indigenous drugs of proved efficacy and properly standardized, we may have a text-book for all Indian Medical Colleges and that would cause no inconvenience to medical practitioners already in practice."

(5)

Sir Nasarwanji Choksey, *Kt.*, C.I.E., Bombay:—

"(1) An Indian Pharmacopœia is, I think, absolutely necessary, and should include indigenous drugs, and preparations, from pharmacopœias of other countries as well. To standardize all such in accordance with Indian requirements and climatic conditions will be an herculean task, lasting for several years and will require a board of selected workers. That will have to be done however.

"(2) Pending the completion of such investigation, the standards should be those of the British Pharmacopœia with additions from the French Codex and the U.S.A. Pharmacopœia."

(6)

The Superintendent, Ronaldshay Medical School, Burdwan:—

"I and my colleagues suggest the compilation of an Indian Pharmacopœia including indigenous drugs."

(7)

Captain P. De, B.SC., M.B., M.R.C.P.E., Calcutta:—

"The compilation of an Indian Pharmacopœia including indigenous drugs in addition to drugs and preparations selected from the pharmacopœias of other countries is indeed a very welcome idea. In view of the fact that all civilized and progressive countries have got a pharmacopœia, it is natural that India should have one of her own. It is also an essential concomitant of legislation for pure drugs which is contemplated, as, without definite workable standards, no Act can work smoothly. The British Pharmacopœia and the United States Pharmacopœia standards cannot be adopted in toto on account of the climatic and other conditions peculiar to India. Due to these, it will become necessary to modify the strength and dosage of pharmacopœial preparations to suit Indian requirements. Further, India is a veritable home of herbs and drugs and most of these herbs and drugs

are used in the various indigenous systems of medicine which are in vogue in India from times immemorial. Therefore, a comprehensive scientific study should be made of all these drugs of purely Indian origin and standards should be laid down in the proposed Indian Pharmacopœia. This will mean the work of some time, even granting that there will be a competent staff of chemists and pharmacologists engaged in the research work solely with the above object in view. So, if we have to wait for the formation of an Indian Pharmacopœia and to depend on the standards to be laid down therein, I am afraid the proposed legislation on pure drugs will have to wait for quite a long time. As it is, India is much behind in her activities and if the compilation of an Indian Pharmacopœia is to precede legislation for pure drugs, it will indeed be a very sad state of affairs.

"Therefore, while believing in the usefulness and convenience of having an Indian Pharmacopœia, I would not be a party to stop the passage of legislation till such time as a pharmacopœia laying down standards is compiled. Let the standards adopted in the British Pharmacopœia be the guide for the present and a beginning be made in the compilation of an Indian Pharmacopœia. When the standards are finally laid therein, the standards of the British Pharmacopœia could be modified so as to suit the requirements of India."

(8)

Major-General C. A. Sprawson, I.M.S., Surgeon-General with the Government of Madras:—

"Of the alternatives put forward by Colonel Chopra, viz., the compilation of an Indian Pharmacopœia or the adoption, presumably after adaptation, of the existing pharmacopœia of another country, my preference is for the former for the following reasons:—

"(1) The making of an Indian Pharmacopœia seems inevitable some day. The present use of the British Pharmacopœia with an Indian Addendum is a little cumbrous and does not bring into correct perspective those Indian drugs that are already admitted to pharmacopœial status.

"(2) Other Indian drugs may be found worthy of admission and will obtain admission more readily if submitted to a Committee actually in India.

"(3) It may be found that India alone could introduce metric measures in its pharmacopœia to the exclusion of other measures more readily than it could do if it adopted the pharmacopœia of another country.

"Against the making of an Indian Pharmacopœia may be urged—

"(1) The expense.

"(2) The labour of a Committee sitting for a prolonged period at the start and sitting again at various intervals to keep the pharmacopœia up to date.

"(3) The consideration that all doctors and pharmacists in India are at present trained in the British Pharmacopœia with Indian addenda and a new introduction will entail some dislocation.

"(4) The consideration that India has not in such abundance the pharmacological plant necessary for drug standardization and that the leading druggist firms in India are either British or American and therefore the carrying out of the work necessary for the maintenance of the Pharmacopœial standards will be both more difficult and more expensive.

"In spite of these objections, I favour the formation of an Indian Pharmacopœia."

(9)

Dr. H. V. Tilak, F.R.C.S., M.B., F.C.P.S., Bombay:—

"I am of opinion that it is better to compile an Indian Pharmacopœia because several indigenous drugs such as punarnava, vasaka, kalmegh, kurchi, etc., are now being extensively used and it is essential that they are standardized as regards strength and purity."

(10)

Lt.-Col. K. G. Pandalai, I.M.S., President, Faculty of Medicine, University of Madras:—

"I have the honour to forward herewith a copy of the resolution of the Faculty adopted at its meeting held on the 22nd October 1930.

"The Faculty of Medicine of the University of Madras is of opinion that it is desirable to compile an Indian Pharmacopœia which will contain, in addition to the indigenous drugs, drugs or preparations selected from other pharmacopœias and that the preparation of such a pharmacopœia should be started at an early date.

"In the event of legislation in the near future following upon the report of the Drugs Enquiry Committee, the legal standards that may be laid down should be those of the pharmacopœias concerned. When the Indian Pharmacopœia is completed the standards should conform to those recommended in the Indian Pharmacopœia."

(11)

The Principal, Medical College, Madras:—

"The introduction of an Indian Pharmacopœia which would include, (1) drugs and preparations selected from pharmacopœias of other countries standardized to the requirements and conditions of India, (2) indigenous drugs of allied species and (3) such others as have been scientifically proved to be of therapeutic value, though ideal from the standpoint of determination, utility and economy, would in my opinion not be possible, at the present time. India is dependent on other countries for the supply of a great number of manufactured drugs and the exporting countries mostly follow the standards of the British Pharmacopœia or the United States Pharmacopœia. There will therefore be a practical difficulty in adopting standards exclusively applicable to India alone. The appropriate time for the compilation of an Indian Pharmacopœia will be when a sufficient number of drug-manufacturing centres have sprung up to cope with the medical needs of the country. Moreover, the introduction of drastic variations in the present official standards will adversely affect the export trade of such of those of raw drugs as are sent out of India at present for lack of manufacturing facilities for the preparation of finished products.

"The British Pharmacopœia and the United States Pharmacopœia standards cannot be adopted in toto on account of climatic and other conditions peculiar to India. Due to these, it will become necessary to modify the strength and dosage of pharmacopœial preparations to suit Indian requirements.

"A comprehensive scientific study should further be made of all drugs of purely Indian origin, which are reputed to be therapeutic agents, in provincial central laboratories with a competent staff of chemists, pharmacologists and clinicians. The result of the investigations obtained at these centres should be reported to a Pharmacopœial Committee which will be an official body meeting at convenient and suitable intervals of periods and empowered to examine and report on drugs and their therapeutic usefulness. Those that are declared by this committee to be really valuable as therapeutic agents should be included in an addendum to the British Pharmacopœia which, for the present, can be accepted, with necessary modifications, as the standard. The modifications such as differences in strength and dosage, which will have to be determined to suit the conditions in India, may also be stated in the addendum to the British Pharmacopœia."

(12)

The Principal, Carmichael Medical College and Hospital, Calcutta:—

"I am of opinion that an Indian Pharmacopœia should be compiled. The book should include indigenous drugs in addition to drugs and preparations selected from the pharmacopœias of other countries, the standards of which could be modified, if necessary, according to the requirements and climatic condition of India.

"I placed your letter before the Hospital Committee and all the members present, with the exception of Dr. P. Nandi, hold the same view.

"I understand that Dr. P. Nandi, whose views on the question deserve careful consideration, has submitted a separate memorandum to you."

(13)

The Editor, The Journal of Ayurveda, Calcutta:—

"It is essential that an Indian Pharmacopœia should be prepared to serve as the authoritative work of reference. It is to be based principally on the British Pharmacopœia and should contain notices of galenicals suited to our soil and climate. The appearance of a new national pharmacopœia will be considered as an event of considerable interest, for it may reasonably be assumed that it will reflect the progress of the science relating to pharmacy and medicine during the period the materia medica of the West has been cultivated in India. A mere Addendum to the British Pharmacopœia does not serve the purpose adequately. The importance of such a work as the Indian Pharmacopœia would become manifest when it is considered that it will be designed to represent a standard to which medical men, pharmacists, public analysts and chemical and pharmaceutical manufacturers are expected to conform. The appearance of the Indian Pharmacopœia must not be considered as an innovation. As far back as 1841 'The Bengal Pharmacopœia' was published by Sir W. B. O'Shaughnessy under the authority of the Government. Twenty-four years afterwards, in 1868, the Pharmacopœia of India appeared, sanctioned by Her Majesty's Secretary of State for India in Council. It was based on the British Pharmacopœia, but it contained notices of indigenous drugs of approved value. In the proposed pharmacopœia, standardized preparations of Indian plants and minerals, tested by central laboratories, should find a place."

(14)

The Professor of Pharmacology, Medical College, Vizagapatam:—

"Out of the two alternatives, namely, either having an Indian Pharmacopœia or adopting as our standard some other pharmacopœia like the United States Pharmacopœia or the British Pharmacopoeia, I think the former method is more advantageous.

"Recent researches on scientific lines have demonstrated the value of certain indigenous drugs and their wide clinical trials by reliable authorities have placed the therapeutic value of these drugs beyond doubt. We have thus got 'kurchi' for dysentery, 'kuth' for asthma, 'punarnava' for dropsy, 'daruharidra' for oriental sore and several other drugs which are now fairly widely used by medical practitioners all over the country. In order to maintain uniformity in the preparations and in order to ensure that the patient is getting the right kind of the preparation that the medical man has prescribed, an official recognition of these drugs is essential.

"Apart from these drugs there are a number of other drugs too which are very commonly used in this country but which are not yet officially recognized. As for example, the ethylesters and sodium salts of chaulmoogra and hydnocarpus oil which are so extensively used these days are still lacking official recognition. As a pharmacopœia is expected to give a list of preparations and drugs which are proved to be of real value, an inclusion of the well-known remedies like those given above is highly desirable. This list in this country may be sufficiently large to justify a separate official book to define their properties, methods of preparation, doses, etc. Pharmacological research is gradually progressing in this country and there is every hope that after some years a fairly large number of new drugs may require an official recognition. Similarly it may be found that certain drugs are superfluous and may be omitted from the pharmacopœia, or their strength changed or otherwise modified. The methods of preparation of certain drugs will have to be revised according to the special climatic conditions of this country. As there is more likelihood of the drugs deteriorating more rapidly in this tropical climate, a time will have to be given to certain preparations to maintain their potency. All these considerations lead one to think that a new Indian Pharmacopœia, compiled in these days of scientific research after taking into full consideration the special requirements of this country and after freely consulting the pharmacopœias of other countries, will be highly desirable.

"In the event of some legislation being passed to regulate the sale of drugs in this country, an official book defining the exact requirements for the preparation of a drug will, no doubt, be helpful to facilitate the control of drugs.

"There has been a tendency these days to have an international pharmacopœia instead of having numerous national pharmacopœias. There are more than twenty official books of different countries in the world to-day. It is therefore possible that some confusion might arise in dispensing prescriptions in one country written by a physician of a different country. An example of this is afforded by potent remedies like the tincture of the aconite root. In the nineties, the United States Pharmacopœia strength of the tincture aconite was 35 per cent while the German Pharmacopœia strength was only 10 per cent. One can therefore easily imagine the result, if a prescription written by a German physician was dispensed by an American pharmacist. This diversity of strength has rightly given a demand for an international pharmacopœia and the problem was discussed more than once. The question however arises in the case of potent remedies only and if an international standard is maintained with regard to these remedies, there is no reason why there should not be an Indian Pharmacopœia to meet the requirements of this country.

"I am therefore of opinion that, instead of adopting some other pharmacopœia as our standard, we should have our own pharmacopœia which no doubt will serve a very useful purpose."

(15)

The Professor of Materia Medica and Pharmacology, Grant Medical College, Bombay:—

"I prefer the compilation of an Indian Pharmacopœia. This book ought to include those indigenous drugs which have been found useful after research work and additions made to it from time to time; also preparations selected from the pharmacopœias of other countries, the standards in all the cases being the same, according to the requirements and climatic conditions of this country. I see no disadvantage in this method. The advantages will be—

(1) Drugs prescribed in any part of India will be always of the same standard as prescribed in the Indian Pharmacopœia;

(2) the standards will be according to the requirements and climatic conditions of this country—the most essential point;

(3) drugs will be more useful to the patients;

(4) practitioners will be sure of the standards of drugs which their patients are receiving, and

(5) will give more encouragement for research work in indigenous drugs, for those drugs having the same action in different pharmacopœias.

"I have consulted my colleagues at the Sir J. J. Hospital and they all approve of the idea of having an Indian Pharmacopœia."

(16)

The Professor of Pharmacology and Materia Medica, Seth Govardhandas Sunderdas Medical College, Bombay:—

"In the event of legislation following upon the report of your Committee, standards of strength and purity of drugs will have to be specified. For that purpose, it would be advantageous to have an Indian Pharmacopœia which would include also Indian drugs or Indian substitutes for foreign drugs, so that it would make India independent of other countries in the choice of her drugs and preparations to be used in this country as well as for the revision or alteration of a list so prepared without waiting for the revision of the pharmacopœias of other countries as that of Great Britain which is now overdue and delayed on account of some domestic difficulties of the Committee. The Indian Pharmacopœia will also lay down standards suitable to this climate and other conditions, in addition to those of purely Indian drugs which have been found useful. But such a compilation will take some time and it would be necessary to accept some foreign pharmacopœia for the transitory period. This should be, as I hope, the expected new edition of the British Pharmacopœia or, failing that, the United States Pharmacopœia, as these are

written in a language that can be understood in this country. A permanent committee should, however, be appointed under the Act to prepare a pharmacopœia for India and to revise it at certain fixed intervals, on the lines of the pharmacopœia commission of the United States of America. Such a Committee should be composed of representative pharmacologists, pharmacists, pharmaceutical chemists, physicians and members of the civil (civil hospitals) and military (medical stores) medical administrations, with powers to co-opt experts, when necessary, in other subjects. Perhaps it would be advantageous to have such a Committee to serve a double function, that of the Pharmacopœia Committee, as well as that of the Council of Pharmacy and Chemistry of the American Medical Association, and instead of establishing an independent laboratory of their own they should utilize, as far as possible, the services of existing laboratories at the medical or science colleges and medical research institutes in different parts of India.

"I have given just some indications of the scheme I should like to recommend without full details which can be worked out if it is acceptable. The scheme can also be discussed along with the oral evidence."

(17)

The Lecturer in Pharmacology, Robertson Medical School, Nagpur:—

"It would be preferable to compile an Indian Pharmacopœia which would include indigenous drugs of proved utility in addition to drugs and preparations selected from the Pharmacopœias of other countries, modified according to the requirements and climatic condition of this country.

"This is necessary because the standard of European or American Pharmacopœias does not suit well the local and climatic peculiarities of this country, at least with regard to certain drugs.

"This would lead to more thorough investigation of indigenous drugs, some of which may be found to be approaching or equalling the efficacy of modern standard drugs; and this would help materially to reduce the cost of treatment,—an important factor in the management of Indian patients.

"This would indirectly stimulate the development of pharmaceutical industry in this country which also would tend to reduce the price of medicine. It would become urgently necessary for this reason to introduce strict legislative control over

"(*a*) Manufacture of drugs and chemicals in India, and

"(*b*) their importation from abroad.

"(*a*) So far as manufacture in India is concerned—

"(i) All manufacturers should get their names registered and specify the method and process employed for each manufacture.

"(ii) There should be, if possible, some agency for occasional inspection of the places of manufacture in order to check the introduction of faulty or neglectful methods.

"(iii) No manufacturer should be allowed to put on the market any preparation, unless each batch of manufactured article, be certified by a competent authority to be of the standard of purity and potency specified by the Pharmacopœia for India.

"(*b*) As regards the importation of drugs and chemicals from abroad:—

"(i) All importers should get their names registered with details of imported articles and their manufacture.

"(ii) Every batch of manufacture of such imported articles, should be accompanied by a certificate of purity and potency specified by the Pharmacopœia for India.

"(iii) In case the certifying agency be a foreign one and one which the authorities here do not regard as thoroughly competent or reliable, the importer should be liable to get such imported articles certified by agencies regarded as competent, before he puts the imported articles on the market."

(18)

The Head of the Department of Pharmacology, Lucknow University, Lucknow:—

"The proposal to compile an Indian Pharmacopœia is undoubtedly the best, in the event of legislation following upon the results of the 'Drugs Committee'. The British Pharmacopœia is naturally based on experience and observations in the Western countries and is at times at variance with the requirements and climatic conditions obtaining in India. It is a known fact that certain drugs deteriorate rapidly due to climatic conditions of this country. To find stable substitutes may require different methods of preparation. A properly compiled Indian Pharmacopœia will be a great help to the medical profession as well as to the chemists and pharmacists. It will provide the medical profession in this country with authoritative information about the large number of indigenous drugs which have been recently investigated on scientific lines and found to be as useful as the imported ones. The British Pharmacopœia Commission has already decided that an addendum to the British Pharmacopœia is to be drawn up by the local authorities. It is obvious that an Indian Pharmacopœia will be more desirable than the proposed addendum. The Indian pharmacopœia will comprise (1) Imported drugs and their preparations of determined strength and purity and (2) Indigenous drugs which have so far been scientifically investigated and found therapeutically useful.

"If the proposal for compilation of an Indian Pharmacopœia is agreed to, it would seem desirable that the future Indian Medical Council should be given the power to publish under their direction a book containing a list of medicines and compounds and the means of preparing them together with the weights and measures by which they are to be prepared and mixed and containing such other matters and things relating thereto as the Indian Medical Council should think fit—to be called the Indian Pharmacopœia—as under the British Medical Act. An Indian Commission, on the lines of the British Pharmacopœia Commission, would eventually have to be appointed under the authority of the Indian Medical Council to prepare such a publication."

(19)

The Medical Association, Benares:—

"The Medical Association, Benares, unanimously supports your proposition No. 1 (regarding the compilation of an Indian Pharmacopœia), for the following reasons:—

'(1) That it would encourage research work in indigenous drugs peculiarly suited to the requirements and needs of the country.

"(2) That in the treatment of tropical diseases several indigenous drugs are quite successfully employed in their treatment.

"Hence it is extremely desirable to compile an Indian Pharmacopœia on the terms proposed by you."

(20)

The Registrar, Osmania University, Hyderabad, Deccan:—

"Report of the Sub-Committee of the Medical Faculty, Osmania University, appointed to consider the question of having an Indian Pharmacopœia raised in the letter of the Chairman, Drugs Enquiry Committee.

"We are unanimously of opinion that it is desirable to compile an Indian Pharmacopœia at the earliest possible date. This should include, as the letter mentions, indigenous drugs in addition to those selected from the pharmacopœias of other countries, the standard being modified, if necessary, to suit local climatic conditions.

"To make the work one of real utility and of manageable proportions, we believe—

"(1) A number of drugs and preparations which find a place in the current edition of the British Pharmacopœia, which is our present standard, but are little used, might safely be omitted (and will probably be omitted in the next edition of it).

"(2) In the case of vegetable drugs, locally obtainable species might be used instead of foreign ones—always, of course, on condition that this does not involve a lowering of therapeutic efficiency.

"(3) Drugs of proved value but not yet included in the British Pharmacopœia might be included—this would apply particularly to drugs of Indian origin investigated by modern methods.

"(4) As regards standards of strength and purity—

"(*a*) In the case of preparations for which international standards have been already fixed, these standards should not be changed.

"(*b*) In other cases, changes may be made if necessary.

"(5) We would also recommend the adoption of the metric system, and the graduation of measures at 25 c (as in the United States Pharmacopœia) instead at 15 c (as in the British Pharmacopœia) as the former is nearer to our prevailing temperature conditions.

"We would state at once that if saving of labour is alone the end in view the course we recommend (the preparation of an Indian Pharmacopœia) has every argument against it for all this labour can be saved by adopting bodily as our standard some other pharmacopœia, be it the British, as at present, or any other.

"We believe that the undertaking of the compilation of an Indian Pharmacopœia will stimulate investigation of indigenous drugs and the manufacture locally of their preparations, as nothing else can.

"As regards the actual work of compiling the pharmacopœia, it should be entrusted to a Pharmacopœial Committee of the General Medical Council of India with sub-committees for various sections of the work as is done in other countries. We of the Medical Faculty of this University would be glad to give our hearty co-operation in the work."

(21)

The Principal, Medical College, Vizagapatam, and President, Faculty of Medicine, Andhra University:—

"I am in favour of adopting a standard such as the British Pharmacopœia. There is not sufficient known about the indigenous drugs and their preparations to be included in any pharmacopœia at present."

(22)

The Superintendent, Lytton Medical School, Mymensingh:—

"I beg to add that I am in favour of compiling an Indian Pharmacopœia. If that is not practicable, I am in favour of adopting as a standard the 'British Pharmacopœia'."

(23)

Rai Harinath Ghosh Bahadur, M.D., Calcutta:—

"I would prefer having choice of plan I. In doing so, so far as I see, things of plan II do not altogether stand dissociated. In giving effect to plan I, things of plan II necessarily have to be drawn upon as much as is decided by the Council whose construction has been suggested by me in reply to your question No. 6. I would mention that even the current B.P. is one largely modified from the previous one by absorption of materials current in India and the Colonies. Plan I is suitable from several other important aspects, namely, the economic aspect, saving as much as possible the country's loss consequent upon import from other countries. Besides, there are the aspects of making India self-contained as regards its drugs as much as is possible and also of promotion of drug cultivation and drug collection on a scientific basis in the country—India being a country of all climates and of suitable geological structure for such an undertaking which to India might be a source of good profit even. The idea of such a culture on scientific lines is already afloat in America, a point to which I already drew public attention in my opening address at the All-India Medical Conference that sat in Calcutta two years ago. Further, adoption of plan I would go a great way to do away with communalism in the science of medicine in India

often to the detriment of the sufferers—to wit—the spirit of difference not unoften seen between a kabiraj and a doctor of medicine trained on up-to-date lines relative to the use of therapeutic agents. The longstanding controversy, whether popular or by experts, as to the suitability of Indian drugs on their own merit based on long empirical test would thus be largely speedier reconciled. An Indian corpus of the pharmacopœia can also be taken as a necessary corollary to the worthy suggestions of Sir George Watt in his address at the first Indian Medical Congress and plan II would mean much of preserving a status quo which from the time of Sir George has been felt as needing a change on very justifiable grounds to which we have many others to presently add—as I have shown above and which all found an expression in my address at the All-India Medical Conference referred to above. And, lastly, the adoption of plan I would have the merit of promoting a co-operative pursuit in productive scientific investigation by our University graduates, thus opening a field for them too."

(24)

Dr. A. C. Ukil, M.B., M.S.P.E. (Paris), Calcutta:—

"Once the principle of control is admitted, the best means of doing that in India may now be thought out.

"Most of the Western countries have established standards for their pharmacopœias which, though they resemble closely regarding many drugs, differ also regarding some and the standards of many. In India, the B.P. standard has hitherto been most in use. But I feel that each country must evolve its own standards according to the availability and quality of the raw products, the system of therapy prevalent in the country since ancient times and the experience of clinicians, chemists, pharmacologists and botanists. It has been the experience of clinicians that, with certain plants, watery extracts yield the desired result, while none is obtained from using an alcoholic extract and it has so happened that crude drugs have yielded results where alkaloids extracted by modern methods have remained inactive. It has also been found that barks and other parts of various plants vary in alkaloid content in different parts of India and also according to seasons and the age of the plant.

"Hence, raw as well as finished products ought to be standardized and controlled.

"As regards the sources of B.P. preparations, there are already many which can be replaced in India, e.g., gentian, rhubarb, squill, hyoscyamus, aconite, digitalis, belladonna, podophyllum, etc.

"Hence most of us feel that the compilation of an Indian Pharmacopœia has become an urgent necessity. It will mean that the raw products of the country will be utilized as also medicines will be offered at a cheap price, a great point in the national economy. Such a pharmacopœia will assimilate into it such preparations of the United States, British and German Pharmacopœias as will be found absolutely necessary for the present, but will also have to incorporate a large number of Ayurvedic and Hakeemi drugs which have been found to be efficacious on clinical trial since long years. It may be argued that many Indian drugs have not yet been properly studied, but before and during the compilation of the pharmacopœia in many Western countries, medicines were given empirically when they were found to be efficacious on clinical trial. It should not be forgotten that though laboratory research makes the foundation for systematized knowledge, clinical trial is the final arbiter regarding the efficacy of a drug.

"Thus it stands that three categories of drugs will have to be incorporated into the proposed Indian Pharmacopœia:—

"(1) Preparations taken from the foreign Pharmacopœias;

"(2) those indigenous medicines which have been up till now scientifically investigated and standardized and therefore can be incorporated into the proposed Pharmacopœia forthwith; and

"(3) those indigenous medicines which have been found efficacious on clinical trial but which require further investigation.

"As, before any legislative control can be enforced, we must lay down the standards codified in a pharmacopœia, the appointment by Statute of a committee to compile the Indian Pharmacopœia takes precedence over that of a Board of Control.

"The Indian Pharmacopœia Committee should be composed of 35 members as follows:—

"(i) President.

"(ii) Professor of Pharmacology of the following institutions:—
Calcutta Medical College, Carmichæl Medical College, Calcutta; Patna Medical College; Lucknow Medical College; Lahore Medical College; Grant Medical College, Bombay; Seth Gordhandas Medical College, Bombay; Mysore Medical College; Madras Medical College; Vizagapatam Medical College; Rangoon Medical College; and Calcutta School of Tropical Medicine.

"(iii) Three Directors of Public Health Laboratories.

"(iv) Two eminent physiologists.

"(v) Three eminent clinicians attached to hospitals.

"(vi) Two pharmacists.

"(vii) Three pharmaceutical chemists.

"(viii) Two botanists.

"(ix) Two representatives of pharmaceutical industry.

"(x) Two eminent kavirajis who have also studied Western medicine.

"(xi) One eminent hakeem who has studied Western medicine.

"(xii) Two representatives who are special workers, selected by the Indian Medical Association.

"As a corollary to the compilation of the Indian Pharmacopœia will come the question of forming a Board of Control. The Board of Control should consist of members selected more or less like that suggested for the Indian Pharmacopœia, but there should be a fair proportion of non-official specialists in it. The work of the Board of Control will be carried out by an organization as follows:—

"(1) A Central Laboratory for the biological assay of all products sent from the provincial laboratories and for the assay of sera, vaccines, chemo-therapic preparations and organo-therapeutic drugs. This should be the chief laboratory where not only the assay will be done but standards suitable for Indian conditions should be set up for being followed uniformly in all the provincial branches.

"(2) Provincial laboratories—which should mainly be concerned with the examination of pharmaceutical products and proprietary medicines manufactured in the respective provinces. The existing public health laboratories may be utilized, and, if necessary, enlarged, to carry on this part of the work. All biological products should be examined in the central laboratory.

"For the better working of these laboratories and institutes the indigenous talent should be utilized as far as possible. It will be found that a higher teaching of pharmacy and pharmaceutical chemistry at the Universities will greatly facilitate the supply of competent workers. This means that the Universities, in collaboration with the public health laboratories, will have to arrange for training up to M.Sc., Ph.D., and D. Sc., in pharmacy and pharmaceutical chemistry. As an intensive research will have to be carried on in connexion with the incorporation of indigenous drugs into the proposed pharmacopœia, it is necessary that a stream of workers of the proper standard should be forthcoming. In setting up standards, the question of deterioration of the titre in the tropics has got to be studied and considered also.

"When all the best preparations of the indigenous systems of medicines have been studied and incorporated into the Indian Pharmacopœia, there will be no need to preserve the old methods of the indigenous systems which will be found to be useless on trial. The indigenous systems will then automatically fall into disuse. But attempts to standardize the present day Ayurvedic or Hakeemi medicines are beset with difficulties and legislative control cannot therefore be enforced in spite of the fact that they may be useless or even harmful. We must tap the wisdom of these preparations before they are finally discarded. Public opinion as well as clinical experience make it incumbent for various research institutes to make an intensive study of the indigenous systems on both old and modern lines. Special facilities and money grants should be given to all bona fide research workers in this direction.

"All the attention of the Indian Pharmacopœia Committee and of the Board of Control should be devoted for the first few years to the standardization of the drugs included in the Pharmacopœia. Then will come the time for the passing of a 'Therapeutic Substances Act', for, we have no standards at the present moment to go by.

"Regarding the assay of biological products and certain drugs, the League of Nations have done useful work in fixing up standards and I would advise the use of these international standards for sera, glandular products and other drugs which have hitherto been worked out. In other matters we have the United States, English and German Standards to go by. I would advise the retention in the Indian Pharmacopœia of well-tried indigenous preparations which have been found useful on clinical trial but regarding which the modern scientific methods of investigation have failed to identify and isolate the active principle.

"It should be the purpose of the Central Institute to teach Indians to manufacture therapeutic agents of the proper standard. It should be the aim of the Central as well as of Provincial Governments to encourage pharmaceutical and biological industries by subsidies, the supply of duty-free alcohol and the offer of expert help, where necessary, with a view to make India ultimately self-contained with regard to the supply of medicines.

"It is well known that a certain number of preparations, especially tinctures and alkaloids, are being manufactured in India now according to the British Pharmacopœia. It may be argued that so long as they are manufactured here, some sort of control should be exercised to see that they conform to the B.P. standard. In my opinion, there should be a temporary legislative Act to see that those preparations which are advertised as conforming to the B.P. standard are actually so. All such preparations, before being supplied to the market, should bear labels regarding their strength and date of preparation."

(25)

Dr. Romesh Chandra Roy, L.M.S., Calcutta:—

"I was requested by Reverend Father Caius at the conclusion of my oral evidence on 5th instant to submit to you in writing a short note about the letters that I addressed the Hon'ble Sir Surendra N. Bannerjee and Hon'ble B. Chakravarti as Ministers on the subject of preparing an Indian Pharmacopœia. As I have no copies of those letters, I send you such summary as I can recollect at this distant date.

Scheme of work for preparing an Indian Pharmacopœia.

"(As at present all executive and practically all legislative power is in the hands of Government, it is the Government that we must look up to, leaving private efforts out of count.)

"(A) *Preliminary work—(For each Province in India)*—

"(1) Provincial Governments are to simultaneously notify publicly and widely their intention—

"(*a*) At the end of ten years of the date of notification *to put prohibitive duty* on all pharmacopœial drugs imported from abroad, except those that cannot be prepared here or be available here by the end of the ten-year period; and

"(*b*) *To form at once* a statutory '*Provincial Pharmacopœial Committee*' for that Province only, consisting of local representatives of—

(*a*) Government departments of Agriculture, Botany, Forest, Medical and Chemistry; also the Minister in charge of Commerce	6
(*b*) Pharmaceutical and chemical societies	6
(*c*) Medical associations	2
(*d*) Merchants	2
(*e*) Private Allopathic practitioners (Indian)	2
(*f*) Hakeems	2
(*g*) Ayurvedic practitioners	2
Total ...	22

" *Pharmacopœial Committee*—(B) *Spade work*—

" By means of several *sub-committees* and their salaried officers and servants, the Pharmacopœial Committees will—

" (1) *Collect* through private and paid agencies in the open market, as well as through Government assistant and sub-assistant surgeons *information* about—

(*a*) action, use and dose;
(*b*) availability and quantity available;
(*c*) cost locally; and
(*d*) means of collection and transport; of all drugs used indigenously in the various parts of that province.

" (2) *Utilize all standard treatises on indigenous drugs* and collect together the drugs of known worth and availability.

" (3) *Analyse* or get analysed through private agencies (controlled by the Committee), experiment and study all new or unproved or untried drugs collected, and thereafter, to classify them. (For this purpose alcohol should be cheapened to these agencies.)

" (4) By advice, monetary grant, transport or other facilities, encourage private agencies and Government farms to *cultivate* pharmacopœial drug plants imported from abroad.

" *Pharmacopœial Committee*—(*C*) *Final stage* (at the end of ten years from the date of the notification or earlier)—

" (1) Each Province is to *formulate* its own *local pharmacopœia*, for use in that Province only. The use of such drugs of the British Pharmacopœia as cannot by that time be available here should be incorporated in the Provincial pharmacopœias for a further period of five years. The B.P. may be allowed to be used alternatively for a period of five years only, after the promulgation of the Provincial Pharmacopœia.

"(2) After ten years of use of Provincial Pharmacopœias in *All-India Pharmacopœia* should be substituted, with liberty to each Province to use only certain specified drugs provincially.

" (3) Up to a period of ten years following the promulgation of an All-India Pharmacopœia (i.e., for 10 × 3 years from now) private agencies using *Indian* labour and capital may be given substantial *sibsidies for* the cultivation and manufacture of indigenous drugs used in the Provincial or All-India Pharmacopœias.

" (4) All standard *Ayurvedic* and *Hakeemi* drugs not included in the Pharmacopœias of Provinces or of All-India, but used by followers of indigenous modes of treatment, should also be *standardized* and codified according to law."

(26)

Dr. M. R. Samey, PH.D., M.D., Bangalore:—

" In compliance with your letter No. 192, dated 14th October 1930, requesting me to let you have a memorandum upon the advantages and disadvantages of the two methods Nos. I and II referred to by you in the letter, I have great pleasure in submitting the memorandum as required by you and trust that you will be pleased to consider the suggestions put forward by me to facilitate the work of your committee and confer lasting benefits upon the pharmaceutical and medical profession in India and the public in general. The compilation of an Indian Pharmacopœia is '*sine qua non*' for effective drugs control in India. The adoption of the pharmacopœia of any other country as a standard for India would be anomalous and meaningless and legislation on such outlandish basis is quite unsuitable to the country.

" In the enclosed memorandum I have endeavoured to show the fallacy of such a procedure and, on a careful consideration of my arguments, *pros* and *cons*, you will, I am sure, recommend the compilation of an Indian Pharmacopœia, which would include indigenous drugs, in addition to drugs and preparations selected from the pharmacopœias of other countries, the standards of which could be modified *mutatis mutandis*, suitable to the requirements and climatic conditions of this country.

"Thanking you most cordially for your earnest solicitations of my considered opinion and affording me a special opportunity to draw up a memorandum upon this important point.

Memorandum

"Four hundred years before Christ, the Rishis of India met at a conference on the banks of the Holy Ganges, to determine the seasons when the most potential herbs are to be gathered to eradicate disease and thus laid the foundation for an Indian Pharmacopœia and to-day, in the twentieth century after Christ, we are agitating to cogitate upon the propriety or impropriety of compiling an Indian Pharmacopœia as against the apish adoption as a standard, the British, United States or some other nondescript outlandish pharmacopœia to suit our country.

"The Drugs Enquiry Committee, hailing again from the historic banks of the Ganges, has conceded to include this question of an Indian Pharmacopœia outside the pale of its original scope of enquiry and four and twenty centuries of national deliberation on this very important point cannot, I am sure, lead the Committee to form any two opinions about the supreme importance and necessity of recommending in their Report the compilation of an Indian Pharmacopœia, including indigenous drugs in addition to drugs and preparations selected from the pharmacopœias of other countries, the standards of which could be modified necessarily according to the requirements and climatic condition of India.

"Awakened to the need of the hour, after a couple of dozens of centuries, shall not the druggists, chemists, botanists, pharmacologists and practitioners combine to make India self-contained as regards such a vital need as a Pharmacopœia for India laying down its own standards? Will the Germans or Japanese submit to British standards? Has the United States condescended to adopt the British Pharmacopœia, as its standard? No, no, no self-respecting and virile nation does it. Then why should India, the mother of herbs and minerals, discomfit herself by such adoption of alien standards? India is already disgraced in many ways by the adoption of outlandish standards and let us not brand the badge of inferiority in this department as well, for ever and ever.

"Even without the adoption of a foreign pharmacopœia as the standard for India, five crores of rupees are drained from our country by allowing influx of foreign drugs and chemicals, annually, and it is to be fiddling when the country is bleeding, to legalize this preventable drain by adopting alien pharmacopœias.

"India has a source of great potential wealth in its home-grown drugs, an industry which only requires the attention of the people to develop on economic lines, says a correspondent of the Lancet, and that attention can be drawn by the compilation of an Indian Pharmacopœia.

"Many of the drugs used in Europe and America, for which some sort of standard has been laid down, grow in various parts of India. Chemical or biological assay of all these can be made and their value relative to those growing in other parts of the world ascertained. It will be necessary not only to assay the plants growing wild in different parts of India, but also to find out their seasonal variation and the soils in which they grow best. Says the correspondent of the Lancet. Artemesia grows wild in some parts of the Himalayas, in Baluchistan, and Hindukush mountains. India could supply the whole world with santonin, if only a little attention were given to its cultivation. It has been recently shown that digitalis deteriorates during transit or storage, and to secure an active preparation it is desirable to get fresh leaves from Indian sources and Digitalis leaves of excellent quality are now available in India. Again, Ephedra Vulgaris grows wild in many parts of Northern India and there is a great demand for it from outside India. America alone ordering 34 tons of Ephedra during 1928 worth four lakhs of rupees. Such researches will be stimulated by compiling Indian Pharmacopœia and putting the seal of authority thereon, *ex cathedra*; so the Drugs Enquiry Committee should recommend the compilation thereof as an essential preamble to drug control in India.

"The Committee of Revision of the United States Pharmacopœia in 1880 and 1881, under the talented leadership of Dr. Charles Rice, broadened the scope of the United States Pharmacopœia in the direction of standardizing its products, and under Professor Remington the movement avanced onward and upward, with mighty strides in 1900. Six years later on 30th June 1906, the Bill known as the National Pure Food and Drugs Act became a law of the United States and has been admirably working there these twenty-five years.

"So twenty-five years after revision of the United States Pharmacopœia a pure Drugs Act became possible and we in India have not the temerity to forge ahead an Indian Pharmacopœia after twenty-five centuries of a conference of Rishis on the banks of the Ganges. Look at this picture and that. The practical Yankee depicts mental agility, and the moody Indian delineates mental lethargy. Uncle Sam's Calendar of an year is brimful of a century of Indian Calendar of practical achievements and, even under the big stick of Britain, India is progressing as a snail.

"An Indian Pharmacopœia Committee must be appointed forthwith composed of the botanist, the chemist, the pharmacologist, and the therapeutist, and the Drugs Enquiry Committee may consider its labours amply rewarded if it can effect the appointment of such a committee or Royal Commission on Indian Pharmacopœia."

(27)

Mr. M. N. Niyogi, Officiating Chemical Examiner, Customs and Salt, Bombay:—

"I should like to refer first how an Indian Pharmacopœia should be prepared. This should consist of two parts, A and B.

"Part A is to consist of Allopathic drugs, and may be on the model of the B.P. In Fact, as a working standard at the start, the B.P. may be adopted.

"Part B is to consist of drugs employed in Ayurvedic and Unani systems of medicines. There may, of course, be some overlapping.

"The drawing up of part B, however, is beset with some quite large difficulties. The main one is that very little or practically little is known of the active therapeutic constituents of many of the drugs employed. Much work will have to be done before this part B can become anything like comprehensive or authoritative. No single research laboratory can hope to exhaustively study the numerous drugs that are employed. My suggestions on this matter are as follows:—

"A semi-official central co-ordinating Pharmacopœial Committee, consisting of eminent medical men (Allopathic and Ayurvedic and Unani), and chemists must be established. At the disposal of this body, a research fund must be placed. This body must disburse these funds to research workers in medical colleges, University laboratories and other research institutions for studying and reporting on specific subjects or materials of investigation, selected by the central co-ordinating body. (The disbursement may be on some such lines as grants are made by the Chemical Society in the United Kingdom or according to the analytical investigation scheme.) The funds so disbursed to each worker must be just sufficient for the cost of materials and apparatus, etc. A system of research by fully paid workers, the cost of running a laboratory, etc., being further met by the Government, etc., will not quite be satisfactory, for the simple reason (1) of cost, (2) many such laboratories cannot be maintained and (3) the paid research worker is liable after some time to think the whole thing a routine. Under the method that I suggest, more laboratories and, what is equally important, more minds can tackle problems.

"The results obtained by the workers will be carefully scrutinized by the central co-ordinating Committee, and tentatively adopted, till confirmation is obtained from several independent workers. In order to assess correctly the results reported from various stations, the central Committee will have to refer results to an expert and impartial testing station. So a small central testing station with an expert medical man and a chemist with knowledge of drug investigation may be started. It will be attached to the central co-ordinating Committee. Further, to aid the co-ordinating Committee, a conference of medical practitioners, chemists and research workers

may be held annually where there will be full discussion and exchange of views, thus suggesting fresh points of attack of various problems; and also giving a more or less authoritative sanction to the various standards tentatively put forth.

"Such an arrangement will also indirectly serve to put the indigenous systems of medicine on a more scientific and better understood basis."

(28)

Dr. Phani Bhusan Mukerji, B.SC., M.B., F.R.C.S., Lecturer in Radiology, Prince of Wales Medical College, Patna:—

"I have some observations to make with regard to the standards that should be fixed for testing the purity of drugs. India must have her own pharmacopœia and her own standards of purity and efficacy of the drugs which are used on her own children. The standards laid down by the British Pharmacopœia are meant for the requirements of the British Isles and British people. They require to be modified when applied to conditions obtaining in India. I would rather wait a few years before pressing for legislation for drug control and in the meantime strain every nerve to get the foundations of an Indian Pharmacopœia laid, rather than rush through a legislative measure taking the British standards laid down in the British Pharmacopœia as standards of purity, potency, and strength of drugs to be used in India on Indian patients and in Indian surroundings."

(29)

Dr. Harihar Ganguly, Deputy Physician, Carmichæl Medical College, Calcutta:—

"If laws are to be passed insisting on drugs being of a certain standard the first step must be a decision on the matter of standards in India. Most of the foreign countries have established standards which have been codified in their pharmacopœias. Though they resemble closely regarding many drugs, they differ regarding some and in the standards of many. In India the B.P. standard is in use. But unfortunately some of the drugs which are mainly imported are apt to lose their potency when they are landed and stocked in India owing to the climatic factor. Hence I feel that India must evolve her own standards according to her climatic condition and also availability and quality of her raw materials. The compilation of an Indian Pharmacopœia will meet the purpose. A committee, should be appointed from time to time to revise the pharmacopœia. There should be a permanent council or Board of Control having Central and Provincial laboratories. There should be a central laboratory for the biological assay of all products sent from the provincial laboratories and for the assay of sera, vaccines, chemo-therapic preparations and organo-therapeutic drugs. This should be the chief laboratory where not only the assay will be done but standards suitable for Indian conditions should be set up for being followed uniformly in all the provinces.

"There should be Provincial laboratories which should mainly be concerned with the examination of pharmaceutical products and proprietary medicines manufactured in the respective Provinces. The existing public health laboratories may be utilized and if necessary enlarged to carry on this part of the work."

(30)

Dr. Santiram Chatterjee, L.M.S., Honorary Secretary, Calcutta Medical Club:—

"We are decidedly of opinion that the time is now ripe for the compilation of an Indian Pharmacopœia which will include the more important drugs and preparations of the western pharmacopœia as also the commonly used indigenous drugs. We are further of opinion that such compilation should be taken in hand as early as possible."

(31)

Dr. A. C. Sen, L.M.S., Delhi:—

"An Indian Pharmacopœia, meeting the special conditions of the country should be compiled and will adopt drugs, formulæ, standards of the British, American and other Pharmacopœias: also include active and useful drugs of Indian origin. Standards laid down in this compilation would be our legal guide."

(32)

Rai Bahadur Maharaj Kishan Kapur, D.P.H., D.T.M. & H., L.M.S., Lahore:—

"A standing committee should be formed to bring out an Indian Pharmacopœia and keep it up to date. The suggestion is to have it in two parts (1) international, in which drugs and medicines of foreign countries are put in; (2) purely Indian, in which indigenous drugs are included after due research and thorough investigation."

(33)

The Honorary Secretary, The Delhi Medical Association:—

"In conclusion, my association stresses the need of an Indian Pharmacopœia which should include indigenous drugs found useful after due chemical, biological and clinical tests in addition to drugs and preparations selected from the pharmacopœias of other countries the standards of which could be modified to suit the requirements and climatic conditions of this country."

(34)

Dr. K. S. Mhaskar, M.D., Bombay:—

"Compilation of a Pharmacopœia of India should be undertaken and provision made for its repeated revision by a permanent committee. This pharmacopœia should contain such of the useful drugs as are found in the pharmacopœias of other nations, and should adopt, as far as possible, substitutes from the indigenous system. No drug should however be admitted into the pharmacopœia unless evidence of its therapeutic efficiency is satisfactory. This pharmacopœia would be of great help to the practitioners who follow the Western system of medicine."

Scheme for compiling an Indian Pharmacopœia suggested by Rev. Fr. J. F. Caius, S.J., Pharmacologist at the Haffine Institute, Parel, Bombay—one of the members of the Drugs Enquiry Committee.

The preparation of the first draft of the Indian Pharmacopœia may be entrusted to an Indian Pharmacopœial Board * assisted by a small staff.†

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* *Board.*

Three full-time Members (one chemist, one pharmacist, one pharmacologist).
Two part-time Members (one botanist, one clinician).
Four Honorary Consultants (one pharmacologist, one bacteriologist, one therapeutist, one biochemist).

† *Establishment.*

One assistant botanist. One assistant physician. One laboratory assistant. One typing clerk. Two menials.	Whole time.

The cost for two years will approximate about Rs. 1,50,000.

APPENDIX O

Quinine policy

(1)

Memorandum by Dr. K. S. Ray, M.A., B.Sc., M.B.Ch.B. (Edin.), Joint Honorary Secretary, Indian Medical Association, Calcutta

In pursuance of your request, I now offer the following comments in elaboration of my remarks on the quinine policy of the Government of India.

In the first place, I would emphasize the terrible incidence of malaria in India. The ravage caused by this disease is enormous. The number of malaria cases treated at the hospitals and dispensaries in British Provinces during the year 1926-27 (*vide* Annual report of the Public Health Commissioner with the Government of India, 1927) is 8,398,775 and the incidence in the different provinces will be seen from the following table:—

Provinces.	Year.	State-Public, Local Fund and private aided dispensaries.		State-Special and railway dispensaries.		Private non-aided dispensaries.	Total.
		In-door.	Out-door.	In-door.	Out-door.		
Delhi ..	1926	2,478	192,331	234	3,364	Nil.	198,407
	1927	2,061	95,081	306	2,573	Nil.	100,021
Bengal Presidency.	1926	6,315	1,615,259	8,450	151,121	384,512	2,165,657
	1927	6,573	1,576,110	7,747	126,710	395,955	2,113,095
The Punjab ..	1926	8,663	1,239,666	3,825	251,693	15,114	1,518,961
	1927	7,796	1,088,053	2,902	227,938	13,065	1,339,154
Madras Presidency.	1926	59,304	636,815	840	33,404	29,382	759,745
	1927	38,579	747,111	1,024	25,134	23,936	835,784
Assam ..	1926	2,190	226,297	1,931	20,082	7,534	258,034
	1927	2,310	232,882	1,664	22,839	8,224	267,919
Behar and Orissa.	1926	3,060	725,696	1,860	75,973	98,489	905,078
	1927	2,934	667,539	1,774	66,348	96,451	835,046
The Central Provinces.	1926	2,513	215,122	931	39,231	32,407	290,204
	1927	2,664	213,814	846	36,890	33,352	287,566
The United Provinces.	1926	5,513	752,503	5,797	103,017	100,690	967,520
	1927	4,959	719,594	5,243	98,381	100,220	947,358
Bombay Presidency.	1926	8,307	577,786	3,581	92,212	112,944	794,900
	1927	8,319	609,972	4,287	77,583	119,714	899,875
The North-west Frontier Province.	1926	1,800	213,863	4,659	43,731	17,249	276,302
	1927	1,671	195,878	3,668	31,897	14,172	247,286
Burma ..	1926	13,940	219,055	4,794	26,178	Nil.	263,967
	1927	15,776	246,348	4,375	25,748	Nil.	292,247
Total ..	1926	114,083	6,614,393	36,902	840,076	793,321	8,398,775
	1927	93,642	6,392,382	33,836	742,041	805,089	8,085,951*

* Including 18,961 cases treated at subsidised dispensaries in the United Provinces.

The actual number of cases, however, is much greater than indicated in the table if we take the figures of the Native States and the cases treated outside the hospitals by private practitioners.

The high mortality from malaria (Bengal alone being responsible for 8 lakhs a year) together with the temporary and permanent incapacity will show that the consequent economic loss must be stupendous.

The Royal Agricultural Commission was of opinion that both for the prevention and for the treatment of malaria a much wider distribution of quinine is necessary (paragraph 411) and the above figures show what an enormous quantity of quinine is needed for the treatment of malaria in India.

At present, the high price of quinine militates against this. Dr. Charles Bentley, the present Director of Public Health, Bengal, has declared that "among the poorer classes very large numbers would welcome the remedy at a reasonable price. I have been repeatedly assured by such people, that they would be too glad to use them, provided the cost be not beyond their means (vide Bentley's *Quinine Policy*—Public Health Department Publication, 1928, page 5)." That quinine is not consumed to such extent as would be helpful from the standpoint of helping the eradication of the disease is however not due to the apathy on the part of the people but their inability to buy—a fact which has been pointed out again and again by various Government agencies.

It would be interesting to compare the quinine consumed per head in the different countries. Whereas Italy consumes 16 grains of quinine per head and Greece 24 grains per head, in India the per capita consumption is only 3½ grains. In Bengal, division by division, Burdwan consumes 1·07 grain per capita, Presidency Division 1·31 grain, Rajshahi 1·07 grain, Dacca 1·50 grain and Chittagong Division 2·62 grains per head of population. These statistics compared with the previous figures of malaria incidence, again, show how inadequate is the present distribution of quinine.

The members of the Quinine Conference held at the Secretariat at Delhi on 3rd December 1925, under the presidency of Mr. R. B. E. Ewbank, Deputy Secretary to the Government of India, Department of Education, Health and Lands, unanimously recorded a resolution declaring that "the demand for quinine in this country is almost unlimited provided that it is available at a price within the means of local Governments and consumers."

India consumes 160,000 lb. of quinine per annum whereas according to Dr. Charles Bentley, if 100,000 lb. of quinine is not consumed in Bengal alone, no appreciable general effect is likely to be visible from its use.

Here I would remark that the mere prevention of adulteration without at the same time reducing the cost in the price of quinine will not enable the masses of India, owing to their extreme poverty, to derive much benefit out of it. It is therefore essential to check profiteering as far as possible, and I shall now touch briefly on some of the main reasons which operate against the reduction in price of quinine.

Taking the average of five years, in the Government Cinchona Plantations, Bengal, the growing of cinchona gives the cost of quinine sulphate in the bar before extraction as being Rs. 5-3-0 per lb. For the same five years the cost of extracting quinine sulphate from the bark varied from Rs. 2 to Rs. 3-6-0 per lb. Therefore the total cost of manufacture of quinine sulphate for the period of five years has been Rs. 9 (vide Malaria, Curse, Cause and Cure, by Elizabeth, Duchess of Carnarvon, page 20). Yet in January 1926, the price of quinine sulphate was Rs. 26 per lb. and in 1930 it is Rs. 18 per lb.

It is nothing short of tragic that this sheer profiteering should prevail in a commodity which is essential for world's health and happiness, in the interests of the Quinine Ring which controls and determines the world prices. As a result of the Quinine Convention of 1913, the world prices of quinine are determined by the Amsterdam Bureau and the majority of sales are made according to prices fixed up by the bureau. Small quantities of South American bark are, however, sold independently (*vide* Malaria Curse, Cause and Cure, page 22). It would seem the Indian Government has agreed to abide by this price arrangement principally to help the interests of Anglo-Dutch Plantation Co., which works in complete harmony with the Dutch Combine, the Kina Bureau. The Government can, if it wills, manufacture the entire amount of its quinine requirements. There are two Government-owned factories in India, one at Mungpoo in the Darjeeling district, Bengal, and the other at Naduvattam, near Ootacamund, in the Nilgiris. The Government agencies manufacture on the average 45,000 lb. of quinine, of which 17,000 lb. are manufactured at Mungpoo. The Mungpoo farm alone has at present a capacity of manufacturing 50,000 lb. of quinine per annum and in order to produce this amount about 1,000,000 lb. of locally grown bark would be required. India exports in the average 6,000,000 lb. of bark annually. Shipments are made from Southern India (*vide* Handbook of Commercial Information for India, compiled by C. W. E. Cotton, I.C.S., for Government of India, page 316). India can grow more, much more cinchona. The Director of the Botanic Survey of India, in his

report of 1928-29, emphatically declares that the difficulties of production of quinine in this country are soluble. Yet India imports annually some 60,000 lb. of manufactured foreign quinine.

We find that the Government not only fixes its price almost at the level determined by the Amsterdam Bureau (thereby forcing the poorer classes to go without the only medicine that counts in Malaria) but also does nothing to replace the foreign importation of quinine by indigenous quinine. The excuse put forward by the Government is that, if the price is not fixed at a level approximating to the ring price, quinine would be exported out of India. This lame and halting excuse will not bear scrutiny. The Government can, if it so chooses, impose a heavy export duty and thus prevent quinine going out of India. Moreover, if prevention of export is the only object in view, why does not Government spend the whole or part of the profit derived from the sale of quinine upon the anti-malarial and other health activities.

The recent Government report of the cinchona plantations and factory in Bengal for the year 1929-30 shows that there has been a further increase in surplus stocks. The profit on the year's working amounted to Rs. 4,53,972. It would be of interest in this connexion to refer briefly to the discussion which took place over the Government stock of surplus quinine at a meeting of the Public Accounts Committee, dated the 4th July 1930, when Mr. B. Das and Mr. Abdul Matin Chowdhury, now a member of the Drugs Enquiry Committee, asked a number of questions with a view to emphasizing the necessity of reducing existing stocks. As a result of discussion it was shown that the Government finds itself unable to dispose of these stocks to the Provincial Governments free of cost, owing to the stringency of the Devolution Rules, while on their part the Provincial Governments find they cannot purchase quinine from the Central Government owing to lack of funds. Thus between the Central and Provincial Governments stocks go to waste and the suffering humanity receives little or no alleviation.

Mr. Bajpai, however, gave out the pious intention of the Government to convene a conference of representatives of the local Governments as soon as the position of Government of India *vis a vis* the local Governments are decided under the new constitution after the Round Table Conference. No worse case of procrastination could be cited; but in regard to the proposed quinine conference the statement made by Sir George Schuster is far from reassuring: "It might be that the aftermath of the Round Table Conference is much more likely to bury this subject. Personally I am disappointed at this result and at the attitude of the Provinces."

In conclusion, I would reiterate the terrible incidence of malaria in this country, the inadequacy of the present supply of quinine, the high cost of quinine which prevents its greater use, and the urgent need for an entire change of the Government's quinine policy directed at once to lowering materially the cost of quinine, encouraging the use of the indigenous supplies and taking steps against adulteration. As a matter of fact, the tendency towards adulteration would be retarded by reduction in price.*

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* Enclosure to the memorandum.

The Statesman, Thursday, Jan. 1, 1931—Java's dictation to India—Cinchona shortage—By Air Mail.

London, Dec. 20.

No one unable to take quinine, on account of idiosyncrasy or otherwise, should be passed as fit to reside in malarious regions of the tropics. This statement was made by Major-General Sir Charles MacWatt, Director-General of the Indian Medical Service, 1922—26, in a paper read at the Cinchona Tercentenary Celebrations at the Wellcome Historical Hall.

"I have seen," he continued, "more than one high-caste orthodox Hindu die from malarial fever which commenced as mild intermittent attacks and become progressively worse *simply* because they would not take quinine which they considered a Western remedy, made by machinery, and, therefore, forbidden."

General MacWatt added that within the Empire existed a large proportion of the malarial tracts of the world; and, as according to Sir Ronald Rose, two million fatal cases occur every year, our responsibilities were great. Dr. A. Balfour estimated that the direct loss sustained by the British Empire due to sickness and death caused by malaria amounted to between £52,000,000 and £62,000,000 annually.

Java's advantage.

Although India and Java started the production of Cinchona about the same time, Java had outdistanced India in a dramatic manner and now produced over 90 per cent of the world's supply of cinchona bark, and India only about 4 per cent. This represented only

(2)

Letter from the Government Quinologist, Government Quinine Factory, Mungpoo P.O., dated the 3rd March 1931, No. 326-112-2, to the Secretary, Drugs Enquiry Committee

The following table shows the cost of the quinine in the bark and of extraction for the last five years:—

	Cost in bark.	Cost of extraction.	Total cost.
	RS.	RS.	RS.
1925–26	4·18	2·03	6·21
1926–27	3·84	1·59	5·43
1927–28	4·08	2·72	7·52
1928–29	4·06	2·72	7·32
1929–30	4·83	2·72	7·55

The selling price was fixed at Rs. 24 per lb. in November 1924 and at Rs. 18 per lb. in May 1926. Since then it has remained at Rs. 18. The selling price is fixed to agree with that of private firms and for any information as to why that should be the policy of Government, I would refer you to Mr. C. C. Calder, the Director of the Botanical Survey of India and the Superintendent of Cinchona Cultivation in Bengal or direct to the Imperial Government of India.

(3)

Letter from the Secretary, Drugs Enquiry Committee, to the Quinologist, Government Cinchona Factory, Mungpoo/Naduvattam, dated the 10th March 1931, No. 1775/1776.

I have the honour to say that the Committee will feel much obliged if you will kindly let me have information on the following points:—

(1) The species of cinchona which are being grown in the Government plantation and in private plantations.

(2) The area under plantation in each case.

I am to enquire whether it is a fact that the *C. succirubra* plantations have practically all been replaced by *C. ledgeriana*.

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about one-third of the amount actually consumed in India; so that she could not supply the needs of other parts of the Empire and fell very short indeed of supplying her own needs, and was obliged to depend on Dutch plantations in Java to meet her wants—and that at a very high price which was dictated and fixed by the Java 'ring'—a very unsatisfactory state of affairs

Sir Patrick Hehir had estimated that for India alone 970,000 lb. of quinine would be the minimum amount required to have any effect on the malaria problem. This represented about six times the amount at present consumed; so that were India in a position to provide merely for her own requirements she would at once have to increase her production by eighteen times. Hence there was an urgent need for an increased production of cinchona and quinine within the British Empire. In India the production of cinchona could be greatly increased by extending the area under cultivation and by more intensive cultivation. It was possible also that there were other suitable places within the Empire such as, the slopes of Kenya, the Tanganyika, where cinchona could be successfully grown.

A swadeshi hint.

Concluding, General MacWatt added, "If we were involved in another war we should endeavour to produce the munitions to wage it within the Empire, as far as possible. In this chronic and intensive warfare against the deadly foe—malaria—India can supply only 4 per cent of its munitions to combat it, in the shape of alkaloids of the cinchona bark. We are obliged to go outside the realms of the Empire to get what is required and that at a cost which the vendors can dictate and fix."

"In India the demand for some years has been for Swadeshi products—cinchona plantations are very laudable Swadeshi products, giving occupations to the denizens of the soil of Mother India and keeping money in the country".

(4)

Letter from the Government Quinologist, Government Quinine Factory, Mungpoo, dated the 14th March 1931, No. 326-112-3, to the Secretary, Drugs Enquiry Committee.

In reply to your enquiry No. 1775 of March 10th, I have the honour to inform you—

(1) The species of cinchona grown in the Government of Bengal plantations are *C. ledgeriana*, *C. succirubra* and the hybrid between these two species. In Madras, *cinchona officinalis* and the hybrid between this and *C. succirubra* are also grown. There are no private plantations in Bengal and very few now in Madras. The Deputy Director of Agriculture (Cinchona), Ootacamund, could give you more information on this point than I can. He could also give you the area of the Madras Government plantations of which he has charge.

(2) The area of the cinchona plantation belonging to the Bengal Government is 2,877·3 acres. (This is the amount actually growing cinchona, the total plantation area is much larger.)

The Government of India also have a plantation in Burma. For particulars of this I would refer you to the Director of the Botanic Survey of India.

(3) *Cinchona succirubra* plantations have not been replaced by *C. ledgeriana* during this century. Till about 1885 a great deal more *succirubra* was grown than *ledgeriana* or other species. But when the manufacture of quinine was begun, in addition to the previously manufactured cinchona febrifuge, in the Government factories, the replacement began and very little *succirubra* was planted again till about ten years ago when it began to find favour among medical men who advocated its cultivation because they mistakenly believed it contained more total alkaloid than *C. ledgeriana*. It really contains about the same amount but as the quinine is less the others are more than in *ledgeriana* and, as the therapeutic effect of quinine appears to be a little higher than the average of the rest the total effect of *succirubra* must be a little less than that of *ledgeriana*. Bengal now has 286·4 acres under *succirubra*.

(5)

Letter from A. Wilson, Esq., M.A., B.Sc., Deputy Director of Agriculture (Cinchona), Ootacamund, dated the 19th March 1931, No. 321, to the Secretary, Drugs Enquiry Committee.

With reference to your letter No. 1776, dated 10th March 1931, I have the honour to inform you—

(1) The species of cinchona grown on the Government plantations are *C. officinalis, C. robusta and C. ledgeriana.*

(2) The approximate area under each is—

Cinchona officinalis	...	...	...	139 acres
Cinchona robusta	...	...	...	957 ,,
Cinchona ledgeriana	...	...	...	939 ,,

(3) There are not more than 50 acres of cinchona under cultivation, so far as my information goes, in South India, mostly of *cinchona ledgeriana.*

(6)

Note, dated 3rd March 1931, by C. C. Calder, Esq., B.Sc., B.Sc. (Agr.), F.L.S., Superintendent, Cinchona Cultivation in Bengal.

1. *Q.*—Do you think the Quinine Convention is artificially setting up the price of quinine in India?

A.—The Kina Bureau, a body sitting in Holland to work the agreement between cinchona planters and quinine manufacturers, determines the price for quinine. The agreement is working smoothly and, generally, Kina Bureau prices are adhered to. Government in India follows world, i.e., Kina Bureau, rates in fixing prices. In this sense the bureau is the determining agency so far as Indian prices are concerned.

2. *Q.*—Do you think Indian bark should be sold at a very much cheaper rate?

A.—Very little and a continually dwindling quantity of Indian bark is sold. Formerly it came in considerable quantities to the Government Madras Factory. Now the drugs of a greatly diminished industry are being exported. I have no exact knowledge of the price this bark fetches, but to judge by the dwindling supply and the lack of all interest in its growing the price cannot be remunerative. Private Indian grown bark, once fairly plentiful, may be said to be a rarity now on the market and when it appears it is absorbed at prices below world rates because of its inferior quality. No Government grown barks are on sale for quinine manufacture, all Government grown stocks being utilized in Government factories. A very considerable area of cinchona in South India was formerly in private ownership and management. This area was due to the direct incentive of Government and both seed and trees went from the Government plantations to its building up. The statement that Government never encouraged anybody in this industry appears to me to be extreme. So far as Bengal is concerned we are frequently asked for seed and advice and those who show interest are helped both ways. Frequently we have to advise correspondents, bent on growing it where it has no chance of success, to desist in their own interests.

3. *Q.*—Supposing the Indian Government did not adhere to the quinine convention—they are not purchasing sufficient bark for India: so far as I remember about 60 per cent of the supply have to be purchased from outside—don't you think that India will be the loser?

A.—I am not sure that I understand this question but I assume the questioner was speaking of foreign (Java) grown *bark* imported on Government account for Government (not private) purposes. It is difficult at this stage to judge whether India would or would not be the loser if this bark had not been purchased. My opinion is that the purchase was a good insurance against failure in local supplies besides being an insurance against an epidemic of malaria and that, possibly, the timely purchase tended to stabilise prices. Foreign purchase of bark has now ceased. Nor am I sure of what the written answer to question 3 attempts. Presumably, however, the representative of the Union Drug Company was thinking of the development of a private bark extractions business in his reply to question 3* and was assuming (erroneously, I think) the free supply of bark at the disposal of the ring.

4. *Q.*—Are large stocks of quinine kept in the country by the Government?

A.—Yes, Government at present hold large stocks of quinine.

5. *Q.*—In the export returns you still find that certain quantities of cinchona bark are being exported?

A.—The dwindling quantities of private Indian grown bark exported are not at the disposal of the Kina Bureau and if they go abroad this is because there is no demand for this bark from private Indian firms or because prices abroad make it more lucrative to ship them out.

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* Reply of the representatives of the Union Drug Company, Limited, Calcutta, to question No. 3:—

"If I have to place any confidence in the reports that have been published in the papers, I think Government can do without purchasing quinine for quite five years. And in five years' time I think the manufacturers will be properly equipped to supply the 60 per cent which the Government don't produce."

6. *Q.*—What would you suggest?

A.—In my opinion the question of quinine extraction by private enterprise is one of minor importance for India. If it pays and local bark is available in quantity, such an industry as the extraction of quinine from bark can easily be left to look after itself. Apart from its associated technical and chemical problems, which Indian chemists should be quite capable of managing, there are no inherent difficulties in this side of the business. But the tone of the answers generally, if I mistake not, expresses a widespread belief that more could be done to produce quinine in India and to cheapen it. What this boils down to is the production of bark. In my opinion, much more of this could be produced. But it is a question of finance and, so far as bark production is concerned, knowledge and experiment. And linked with the problem of bark production is the equally large and difficult problem of financing consumption of quinine.

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